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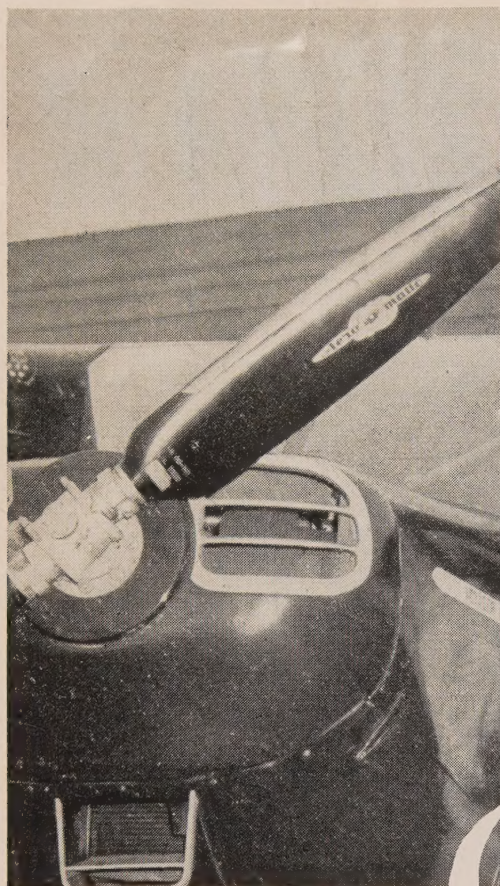
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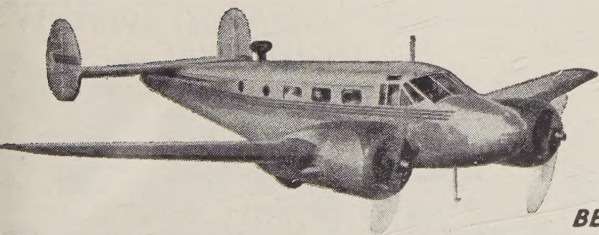


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The Birdmen's Perch

By *Major Al Williams, ALIAS, "TATTERED WING TIPS,"*
Gulf Aviation Products Manager, Gulf Bldg., Pittsburgh 30, Pa.



We liked this story.

A fella we know sat down at an unfamiliar airport, ready for the worst.

Almost before he got off the runway, an attendant was at work wiping off the windshield and the drops of oil from the cowl. Next, the grease monkey asked if there was anything he could do for our visiting friend . . . and he asked it *cheerfully!*

When our friend asked about hotel accommodations, it turned out that the airport operator had a standing arrangement with the town's best hotel, where a good room was available. Transportation to town was also provided, and reasonably.

Next day, our pilot friend found his plane "on the line," serviced and ready to go at the appointed time.

He went his way, loudly praising the splendid (and shrewd!) service policies of the airport operator . . . and has been doing so ever since, a fact which hasn't hurt that airport's business any!

We told you we liked this story . . .

You see, the airport operator is one of our Gulf Dealers!

INSIDE INFORMATION

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experience of ourselves and the rest of the Gulf fliers who log thousands of hours every year.

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We're still waiting for enough mail to show clearly whether you wish to continue the LITTLE KNOWN FACTS DEPT. or want to switch to something like FAVORITE FLYING GRIPES, or what have you.

Meanwhile, we're going to make a few more Perch Pilots, as follows:

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And here's one from Ed Kabel, College Point, N.Y.:

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Bless us, if we haven't got another gal in our select society of erudite hangar fliers! Kay Menges, Hackensack, N.J., adds the Perch Pilot rating to her ticket:

"The first airborne letter in the U. S. was written by Pres. Washington in 1793, carried aloft in a balloon from the Philadelphia Prison Yard."

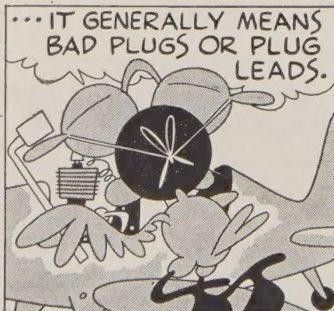
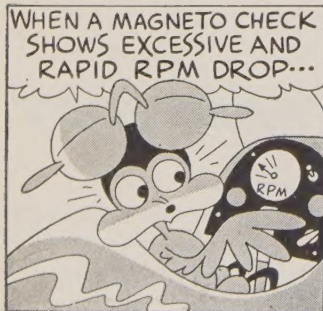
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SKYWAYS

Incorporating Air News

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There are two SKYWAYS: English and Spanish

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AIR YOUR VIEWS

Pro 'Chutists

Gentlemen:

In your December issue you mentioned you knew of only two organizations for professional parachutists, and failed to mention "Deaths Angels."

Members of "Deaths Angels" have performed in air shows and fairs from Arizona to New York, from Michigan to Key West, Florida. We claim to be the only parachute act to feature every type of parachute jump, including delays, cutaways, pulloffs, races to the ground, and the seldom performed human-batwing jump, not to mention wing walking and plane-to-plane transfers.

BOBBY LEEDS

Detroit, Mich.

The organizations we mentioned in the December issue were intended to be strictly clubs to which any parachutist could make application for membership. Glad to hear of "Deaths Angels" and, believe us, its omission was due to our thinking it to be a working group rather than just a professional organization for anyone who is a parachutist. Can any 'chutist join "Deaths Angels"?—Ed.

Canadian Fleet

Gentlemen:

Could you give me information concerning the Canadian-built Fleet, or tell me where I can find all the data on this ship? Is it true that this ship is powered by an out-of-date Warner engine?

H. R. McKINTY

Lincoln, Neb.

Fleet Aircraft, Ltd., Fort Erie, Ontario, built the so-called Fleet trainer, or Finch, back in 1940, and it was used for primary training in the Commonwealth Air Training Plan. A later model, called the 60 or Fort, was used as an advanced trainer. Both of these ships were abandoned in favor of the Fairchild F-62 or Cornell as primary trainer in the RCAF. This was in 1942. Designs for both the Finch and the Fort have been relegated to the "out of production" files by Fleet, and today this company is concentrating its work on new aircraft. The Fleet Canuck is one. The Fleet Finch (1941-42), the ship I believe you are referring to, was powered by a 125 Kinner engine; the Fort used a 330-hp. Jacobs, and the Cornell (1943-44) was powered by a Ranger engine.—Ed.

Bonanza?

Gentlemen:

Will you kindly tell me whether the Beech Bonanza is a dual-controlled or a conventional-controlled plane. And can you give me any information on the Fairchild F-47?

J. ROEDER

Luxembourg

Delighted to hear from a reader in Luxembourg. In answer to your questions, the Bonanza is a conventional three-control airplane, using

a throw-over wheel and rudder pedals on both pilot and co-pilot sides. Dual wheel control can be installed at some extra cost to purchaser. The Fairchild F-47 is still in the experimental stage. There is a possibility of its seeing limited production this year. Nothing has been released on it other than that it's of conventional design, carries four (five on short-range hops) and is a low-wing airplane. Soon as we can we'll run a test pilot's report on it.—Ed.

About Deming, N. Mex.

Gentlemen:

I liked your editorial "A Strong Air Force" very much. While reading it, I recalled how the CAB is messing up the works in my home town. I would like to see Deming get Feeder-line service. A lot of people have said they would like to live in Deming, and if it could get that Feeder-line service they would.

PFC. BLAINE PRINGLE

Andrews Field, Washington, D. C.

Thank you, Mr. Pringle. We, too, would like to see Deming, New Mexico, have that feeder-line service its needs so badly. Last we heard things looked a lot better for it, and so perhaps Deming will have the air service it wants.—Ed.

Business Addresses

Gentlemen:

Will you give me the business address of Roteron, Inc., and Hiller?

J. J. MACH

Chagrin Falls, Ohio

Try Rotor-Craft Corp., 4358 W. 3rd St., Los Angeles, California, for Roteron; and United Helicopters, Inc., 625 El Camino Real, Palo Alto, California, for Hiller helicopter.—Ed.

Pilot's Ticket

Gentlemen:

Upon the successful completion of the CAA tests last August for my private pilot's license, I was given a temporary certificate of 90 days' duration while my log book and other data were sent to Washington. Well, I am still waiting for the log book and permanent license, and my temporary certificate expired several weeks ago! Can you tell me what my status is? I am contemplating the purchase of a plane, but don't want to do so until I have my permanent license.

J. H. YOCUM

Steubenville, Ohio

We understand from CAA officials that there is a general delay in the issuance of permanent licenses. There was no need for your log book to be sent to Washington. The CAA inspector who gave you your flight test should be the one who forwards the necessary papers to Washington, but your log book is not required. We suggest that you contact the Inspector in charge of CAA at the Municipal Airport, Cleveland, Ohio, and tell him your story. He can make a note on your temporary license which will reinstate it for another period of time or until your permanent license comes through from Washington.

—Ed.

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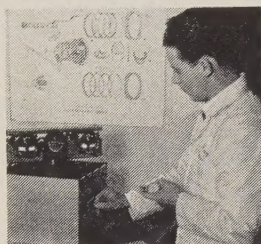
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MILITARY AVIATION

DURING the war, instructors used to tell their fledgling cadets that a fighter pilot with a stiff neck was only one mission away from being a stiff. As a nation we might well heed the instructors' warnings. While we're investigating the "polar concept" and indoctrinating our troops in Arctic warfare, let's also remember to take an occasional squint over our shoulder to the south.

The defense of our own "soft under-belly," and that's just what it is, has always been a problem in politics as well as one of military strength. In the north our approaches can be at least partially defended from air bases in Alaska—land that is our own. But in the south an enemy attack can only be intercepted short of our own mainland from bases in territories of friendly neighbors. This, of course, is one of the reasons our State Department has long endeavored to keep hemispheric relations on the most cordial terms. It is also one of the reasons the USAF built operational air bases in nine Caribbean countries including Guatemala, Nicaragua, Galapagos Islands, Panama, Jamaica, Antigua Island, Trinidad Island, British Guiana, and Puerto Rico. Finally it is the big reason why the recent boot we were given out of Panama is far more serious than is generally realized.

At the time we were asked to evacuate, we had a total of 33 air installations in Panama exclusive of those in the Canal Zone. Twenty-nine of the 33 were of an auxiliary nature, e.g. weather stations, radio installations, etc., but in the event of an emergency many of them would undoubtedly be expanded and made operational. If the Panamanian government is adamant in its decision, there will be no logical recourse but to obtain the consent of other Central American countries to expand our facilities within their borders. Failure to take this step in the shortest possible time would indeed be a serious dereliction of duty.

Fifty-five Come 70

There are straws in the wind to indicate that the Air Force is at long last learning how to handle itself in Washington with some of the same finesse it once exhibited over such places as Frankfurt, Bizerte, and Nagasaki. The recent announcement that the USAF had attained a strength of 55 groups (335,000 officers and men) is one such indication. It is true that there are enough bodies and planes to staff and equip 55 units, but actually only a portion of that number, perhaps 35, are trained to combat efficiency. It will probably be another year before the entire number could conceivably leave our borders on combat missions under their own power.

In the meantime, however, the Air Force is ready and anxious to get moving on its proposed 70 group program—something it can't do without additional funds from Congress. Until now the sticker has been that the generals were working under verbal orders, issued with unusual foresight last summer by their boss, not to wheedle Congress for more money until they could show on paper at least that they had delivered the 55 groups for which Congress had paid. Without stretching the point too far they can now say that this has been done. It was not by coincidence that the goal was attained at the same time budgets for the 1949 fiscal year were being

prepared. It was by much perspiration.

UMT

Air Force officials in Washington are prepared at a moment's notice to get behind President Truman's fight for Universal Military Training if and when they are asked to do so. Speeches have been written and magazine and newspaper stories have been ghosted. But in all probability neither the speeches nor the stories will reach the public unless pressure is brought to bear from top side. The truth is that the Air Force isn't at all sold on UMT as currently proposed. It feels privately that a year is too long to spend on basic training and not long enough to teach many of the highly technical skills. Furthermore the Air Force has little desire to teach those skills which *could* be acquired within a year to a bunch of youngsters who would revert to civilian status as soon as they had completed their training. It's expensive and if the youngsters were ever called to active duty later it would be necessary, because of technological progress, to re-train them anyway. Lacking an alternative proposal, however, the USAF will "string along."

Air Notes

Don't be surprised if in the near future the Air Force and the Navy announce the pooling of their research and development efforts at Wright Field. It would be a logical step under unification and one which would stand to save the taxpayer a pretty penny.

Speaking of money, the astounding Finletter report which is undoubtedly the most momentous document in aviation history, will probably be tagged somewhere short of first base unless action is demanded from the grass roots. With elections less than a hop, skip and a leap-year away, neither the Republicans nor the Democrats are particularly anxious to add to the nation's financial burden. In the meantime the question remains. What less can we do than is recommended by Finletter and still insure our security?

And speaking of security, Air Force officers in Washington are still in a red flush of anger over the release of the story of the XS-1. No one can deny that in many instances, especially during the war, inexperienced or over-cautious security officers have placed unnecessary and sometimes stupid restrictions on releasable information. Unfortunately when this happened, too many newsmen immediately attacked all forms of censorship as an "abridgment of freedom of the press," and with this euphemistic defense of their actions went on to print anything they saw fit. There is nothing wrong with the Army's security regulation AR-380-5. It seeks only to withhold that information from the enemy (or potential enemy) which would be of "aid or comfort" to him. The XS-1 story certainly falls within that category. It is of comfort because it is an excellent index of our progress in supersonic flight. It is of aid—great aid—because it eliminates for other powers the months of research we invested in design. By industry, careful planning and great research we achieved a considerable advantage in this highly important field. By the desire of one publisher to get a scoop we have probably lost that advantage. C. E. R.

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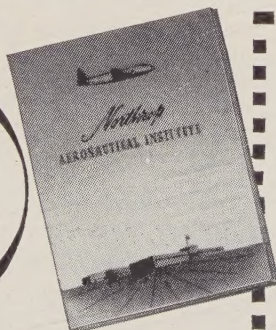
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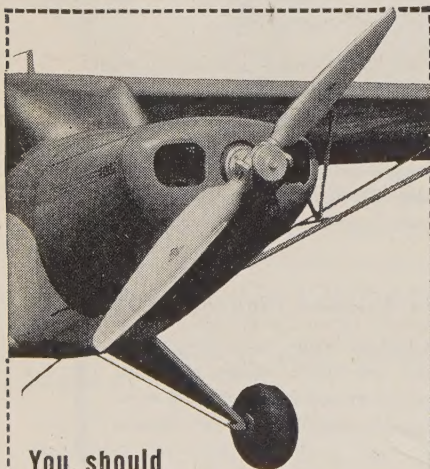
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PROP WASH

Aero Oddities

Wing and a Prayer. On a X-C a pilot encountered bad weather which necessitated going on instruments. Knowing his buddy and "passenger" riding in back had an instrument rating, pilot decided to try his own skill at "ridin' thru." When sunshine and terra firma were again seen, the pilot yelled to his buddy, "Hey, how's that for instrument flying!" His friend yawned, shook himself awake, and mumbled, "Instrument flyin' . . . when?" (P. Kay, Tampa, Florida)

Charmed Life. Student pilot making a X-C was caught out after sunset. Spotting lights ahead, he thought them his training field and so brought the ship down for a safe landing. When he climbed out of ship, he discovered he was in an empty field, with deep ditches on either end and surrounded by wires. Next day when instructor drove out to fly ship to homebase, the field was found to be so bad the plane had to be carted back on a truck. (J. D. Belcher, Wichita Falls, Tex.)

Surprise. Having some time to spare a businessman pilot drove out to airport and got in some flying time. While in the air, pilot noticed another plane land at the field and its occupants walk over toward the road. Knowing there was no one in attendance at the field, pilot landed his plane to offer visiting pilots some assistance. He discovered visitors were his wife's sister and husband who had flown in to surprise him, both with the visit and the fact that they'd learned to fly and had purchased a plane. (M. C. Axelton, Meade, Kansas)

Dunked. Youthful Naval Aviation Cadet was getting some seaplane time at a base just opposite field where he'd received his land-plane instruction. Coming in for a landing, cadet forgot he was in seaplane and started to land on runway. When instructor called

"mistake" to his attention, cadet pulled seaplane up and around and landed on water. Then climbed out of cockpit on to the step and into the water! (J. V. Shaw, Jr., Newburgh, N. Y.)

All Gone. On routine Navy gunnery hop in an SBD, a young Ensign had his intercom radio on "I.C.S. All," which meant that any messages he sent would be received by all planes in the group. When Ensign's plane developed engine trouble, he told his gunner to bail out. It happened . . . all planes got the message, three gunners thought it was their pilot talking. . . . and each bailed out! (R. G. McCann AMM 2/C, Jacksonville, Fla.)

Rescue Flight. A car, traveling over a stretch of bad roads covered with too much snow, became stuck. Pilot of a ski-equipped lightplane flying overhead saw the distressed land lubber, landed his plane on field next to road, helped the car owner out of his difficulties, then took off again and flew away. (Jim Dutch, Aberdeen, S. Dak.)

Pilot Hazy. Upon completion of a breakfast flight, one pilot complained of hazy conditions that existed along the route. Other pilots expressed amazement at this and said they'd found conditions perfect, but suggested pilot have a look at his sunglasses. He did . . . and blushing found them so fogged with dust and finger prints he could hardly see through them. Once cleaned, all haze disappeared. (J. W. Drawbell, Toronto, Canada)

Att'n Readers:

If you have any news note oddities pertaining to aviation, send them to SKYWAYS, Box, 17, 444 Madison Avenue, New York 22, N. Y. Five dollars will be paid the sender of each "oddy" printed. Contributions cannot be returned unless accompanied by stamped addressed envelope. The decision of the editors is final.

Standard of California's **PLANE FAX**



A page of service tips for private flyers and fixed-base operators

How to prevent high altitude vapor lock



Just as it does with water, each thousand feet of altitude lowers the boiling point of gasoline. That's why light fractions which are very well behaved on the ground can cause vapor bubbles in fuel lines or carburetors at high altitudes. To prevent this, Chevron Aviation Gasoline is carefully blended to make sure it's perfectly balanced to give easy starting on the ground, dependable performance at all altitudes.

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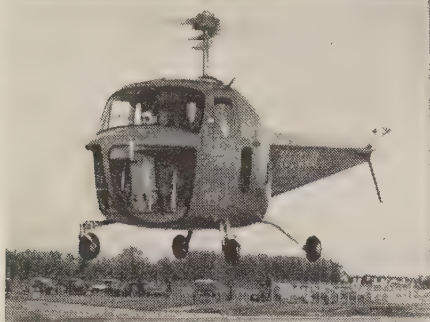
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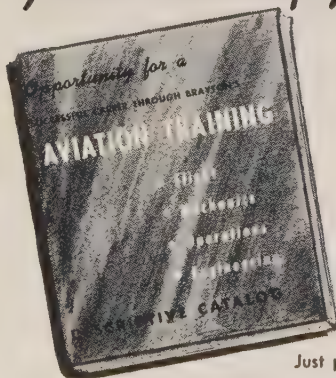
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Preparedness for Peace

AN EDITORIAL

THE Iron Curtain has been a very effective shield against detailed knowledge of what Soviet Russia is doing in many respects, but some information does leak through from time to time. It is therefore highly advisable that we keep our eyes and ears open.

In the past few months, SKYWAYS has been hammering at the terrible urgency which faces us in gathering our forces—particularly our Air Forces—as rapidly as possible for the sole purpose of keeping the peace which our sons and the sons of our allies won for us. Dictators can move to accomplish their ends with lightning speed, because they need only order a thing done and it is done, at whatever cost. Democracies are ponderous, slow-moving bodies which must deliberate and compromise opposing points of view. Once aroused, however, they always have the invincible will of free men—a strength that has withstood the most dreadful shocks that tyranny could hurl against them. But—and it is a *but* which should give us furiously to think—we are gambling now with the dice loaded against us. Man alone can no longer withstand the weapons which science has created, no matter how magnificent his will or his courage.

One of our major shifts in strategic thinking is the result of such scientific development. In the days of reliance on surface transport, we thought in terms of the Mercator map, with all our ideas pointing from east to west. Now we have been forced to think in terms of the polar projection, reversing the trend to a north-south axis. The world's land masses seen on the polar projection map, are bunched around the North Pole—and Russia has the preferred position, the United States is a poor second, geographically speaking, in the Air Age—and it is these two countries which control the greater portion of this area. It has become a matter of common expectancy that any attack which is made will come over the Pole.

With regard to some of the information we have on the subject, let's look at a few significant facts. Russia has the one year-round ice-free port in the polar area—Murmansk. Our ports are frozen in nine months of the year. On the surface, they can navigate their northern route and three great river basins a distance of 12,000 miles. Their main industrial developments are now concentrated in these regions and this development is not new—they began thinking in terms of such development as far back as 1919. By 1928, they had an Arctic Commission at work preparing plans and breaking ground. Their industrial cities have grown tremendously—just how greatly, we do not know. But the railway to Murmansk has been electrified and that one city increased in population from 3,000 in 1916 to 117,000 in 1929. On the same meridian, our outpost of Aklavik number 200. The last pre-war figure for Archangel was 280,000, while Nome is 2,500. Great mineral deposits, including coal, iron and oil surround Vladivostok and Providenia, almost across the 50 odd miles of the Bering Straits from Nome,

has coal and freight facilities, saw mills, and oil storage tank farms. Hundreds of weather stations are connected by radio and there is a complete communications network. We have a dozen!

This is the background against which we should set our new concepts of what we must do to protect the peace. It is probably the most difficult and costly task which has ever confronted a nation. We are tremendously proud of our industrial capacity and skill, of the fact that we produced over \$100,000,000,000 worth of military equipment during World War II. That very fact makes our industrial heartland the primary objective of any enemy which chooses to attack us. An attack which would come without warning—unless we improve our warning system to an extent never before contemplated.

Our industrial concept must be geared to an entire new set of weapons—those of World War II are as obsolete as bows and arrows. Supersonic aircraft speeds, for example, demand new metals which can endure the heat of jet power plants. There will be small place for unskilled labor in the new factories. Aircraft surfaces will have to be not only true airfoil sections to a tolerance of plus or minus three thousandths of an inch but as smooth as polished glass. Our instruments, our bombs, our guns, our fuels must alter radically if they are to meet the demand of supersonic speed. And the human body must be reinforced to meet them.

Radar must go far beyond its present limits. As General George C. Kenney, Commanding General of the Strategic Air Command, said recently: "We want to watch the whole world and see what it is doing. The speeds of tomorrow will make our present warning service not only obsolete but useless. As a matter of fact, when every nation can see day and night what the rest of the world is doing, it may be impracticable to plan on a war and we may have peace. However, just to counter too many hopes along that line, we need a camouflage against the radar. It is alright for us to pick up the approach of an enemy aircraft but we don't want him to be able to pick up ours.—The long-range controlled missile of tomorrow must be countered. We not only must be able to detect that it is on the way but must quickly find the frequencies on which it is being operated and then cut in with our own radio control and prevent it from reaching us.

"What we are up against," continues the General, "is an entirely new field of manufacturing. Whether we like it or not, the scientists, the physicists, the chemists and the engineers are burning the midnight oil all over the world these days trying to devise newer and more destructive weapons."

We taxpayers are going to have to put our hopes of economy on the shelf for a long time to come, if we still value our lives and our liberties. There are sober faces in Washington these days and Congress is going to ask us to dig deep in our pockets. The cost is small compared to that of one atom bombed city.

J. FRED HENRY

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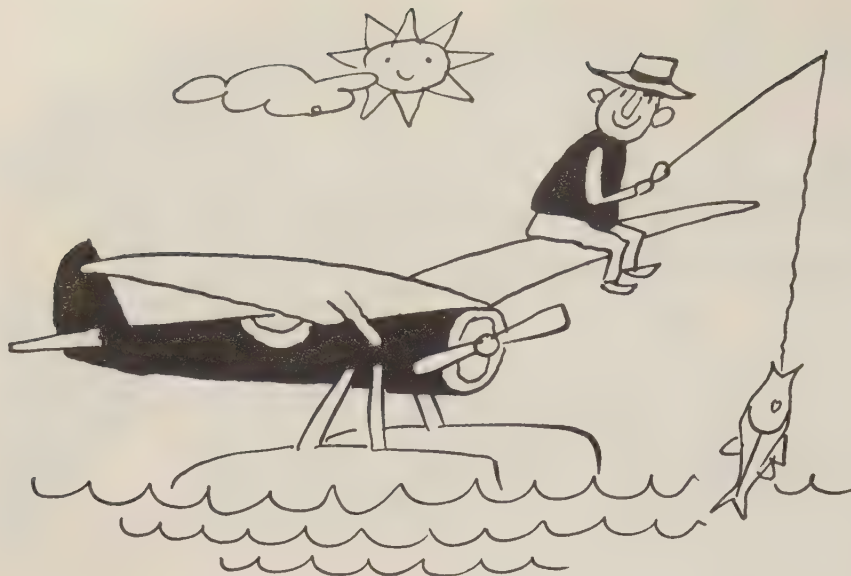
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Where to Fly

ARIZONA

The months of February and March find many a vacationer heading Southwest-way for a stay of a week or weeks at one or another of the country's top-ranking dude ranches. Cowboy boots, lariats and ponies wield an attraction far beyond that of sea-shore or city life for many hundreds of vacationers every year. And down in Arizona country there are more than a hundred really very excellent dude ranches that are ideal vacation spots for those who enjoy cow-country living. Rates at these ranches range all the way from \$40 and \$50 per week single, to as much as \$180 and more, double, per week. For a list of dude ranches, we suggest that you write the Chambers of Commerce at Tucson, Phoenix, Prescott or Flagstaff, Arizona. And don't accuse us of treason if we suggest that you also write the Southern Pacific Lines' (Sh . . . railroad) representative in your locality and ask him for the list of guest ranches which his company has printed in booklet form. The SP's list is a very good one.

Just as a great many vacationers trek to the desert resorts by airliner, so many go via personal plane. For those readers who are contemplating a dude ranch vacation and who would like to go via personal plane, we have compiled the following list of airport facilities in Arizona.

Personal Pilot Information:

International Airport—Douglas. (Cl. 2) El. 4,181 feet. Hard runways, N/S, E/W, NW/SE. Rotating beacon. Boundary, range, flood and obstruction lights (on request). Wind sleeve on hangar. Lighted wind cone and T. Hangar, major repairs, 73, 80 and 91 Octane fuel. No tie-down fee. Taxi to town 2 miles. This field is a Port of Entry to Mexico. (Douglas Chart)

Wagon Wheels Ranch Airport—Tucson. (Cl. 1) El. 2,200 feet. Bare strips, N/S,

NW/SE. Wind cone. Hangar, major repairs, 80 Octane fuel. Private car to town 5 miles (Phoenix Chart)

Tucson Airport—Tucson. (Cl. 5) El. 2,550 feet. Oiled runways, N/S, NE/SW, NW/SE. Rotating beacon. Landing lights on pre-arrival request. Wind cone, traffic T. Major repairs, hangars, 80, 91 Octane fuel. Tie-down fee \$1. Some food facilities at field. Bus or taxi to town 6 miles. (Phoenix Chart)

Three Point Airport—Casa Grande. (Cl. 2) El. 1,400 feet. Clay strips, N/S, NE/SW, NW/SE, E/W. Traffic T. Minor repairs, 80 91 Octane fuel. No tie-down charge. Meals at field, some lodging facilities. Airport courtesy car to town 1 mile. (Phoenix Chart)

Airhaven Airport—Phoenix. (Cl. 2) El. 1,150 feet. Dirt runways, NW/SE, NE/SW. Traffic T. Repairs, 80, 91 Octane fuel. Tie-down charge 50¢ and up. Meals at airport. Lodging facilities adjacent to field. Complete facilities in town. Taxi or bus 4 miles. (Phoenix Chart)

Coolidge Airpark—Coolidge. (Cl. 2) El. 1,400 feet. Dirt runways, NW/SE, E/W. Wind sleeve. Hangar, 73 Octane fuel. No tie-down charge. Taxi or private car to town 1 mile. (Phoenix Chart)

Gilpin Airport—Tucson. (Cl. 5) El. 2,200 feet. Runways, N/S, E/W, NE/SW, NW/SE. Wind sleeve on hangar. Flood lights and runway lights by circling field. Rotating beacon. Major repairs, 80, 91 Octane fuel. Meals available at field. Bus or taxi to town 4 miles. (Phoenix Chart)

Wickenburg Airport—Wickenburg. (Cl. 2) El. 2,380 feet. Runways, NE/SW, NW/SE. Tetrahedron, wind cone. No tie-down charge. Repairs, 80, 91 Octane fuel. Overnight accommodations. Courtesy transportation to town 15 miles. (Phoenix Chart)

Wickersham Airport—Safford. (Cl. 2) El. 3,000 feet. Runways, N/S, E/W, NW/SE. Wind sleeve on hangar. Landing lights may be in operation. Check. No tie-down charge. Major repairs, 80, 91 Octane fuel. Snack bar at field. Taxi to town for full facilities 2 miles. (Phoenix Chart)

Superior Airport—Superior. (Cl. 1) El. 2,600 feet. Graded strip, NE/SW. Wind sleeve on hangar. Righthand traffic pattern SW. Mechanic on request. Hangar, 80 Octane fuel. No tie-down charge. Obstructions hazardous, so watch your approach. Taxi or airport courtesy car to town. (Phoenix Chart)

Love Field—Prescott. (Cl. 4) El. 5,042 feet. Paved runways, NW/SE, NE/SW. Boundary and obstruction lights continuous. Landing lights on request, no charge. No tie-down charge. Repairs, 80, 91, 100 Octane fuel. Meals and lodging facilities available on field. Bus, taxi or airport limousine to town 8 miles. (Prescott Chart)

Winslow Municipal Airport—Winslow. (Cl. 6) El. 4,937 feet. Paved runways, NE/SW, E/W, N/S. Traffic T. Landing lights by circling field or radio contact. No fee. Repairs, 80, 91 Octane fuel. No tie-down charge. Taxi to town. (Prescott Chart)

Valle Airport—Valle. (Cl. 2) El. 5,990 feet. Gravel runways, N/S, E/W, NW/SE. Wind sleeves. Landing lights on until 8 PM. On request later by circling bldg. at 500 feet. No fee. Some repair, 80, 91 Octane fuel. Limited lodging available at field. Taxi to town 2 miles. (Prescott Chart)

Bisbee Airport—Warren. (Cl. 2) El. 4,750 feet. Gravel runways, N/S, NW/SE, NE/SW, E/W. Wind sleeve. Landing lights by circling field. \$7 charge. Tie-down 50¢ and up. Hangar, repairs, 80, 91 Octane fuel. Complete facilities in town. Taxi. (Douglas Chart)

Nogales International—Nogales. (Cl. 4) El. 3,938 feet. Runways, NE/SW, N/S. Tetrahedron. Beacon, contact and obstruction lights by circling field, \$5. No landing fee for private planes. Tie-down 75¢ and up. Repairs, 80, 91 Octane fuel. Free transportation to guest ranch for those who plan overnight stay. Port of Entry to Mexico. Taxi to town 8 miles. (Douglas Chart)

Port Kingman Airport—Kingman. (Cl. 4) El. 3,453 feet. Gravel runways, NE/SW, E/W. Wind sleeve. Landing lights by request. No tie-down charge. Repairs, 80, 91 Octane fuel. Meals at airport. Airport car to town 3 miles. (Prescott Chart)

Koch Municipal Airport—Flagstaff. (Cl. 4) El. 6,587 feet. Cinder runways, NE/SW, NW/SE. Wind cone. No tie-down fee, Hangar, repairs, 80 Octane fuel. Full accommodations in town 9 miles. Taxi. (Prescott Chart)

Editor's Note:—Airport information supplied in the "Where to Fly" columns is to be used as supplementary material only. For detailed information we suggest that you consult CAA's Airman Guide. We invite your criticism and correction of any errors that might occur. Your help will help us to provide personal pilots with accurate and necessary airport data.



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SKYWAYS

April Issue

HANGAR FLYING

Float Booster

EDO AIRCRAFT, long-time builders of floats, recently announced a 20 percent improvement in take-off performance with their Model 1400 floats for lightplanes. The gimmick that does the trick is called a hydrodynamic booster and was developed by Edo's engineers. Six inches wide and 30 inches long, the boosters are made of dural and are riveted to the bottom of the floats. They are concave, thus adding a scallop shape to the float bottoms. This particular shape has been found to help getting up on the step with a heavy load, no wind and glassy water conditions. The boosters are mounted on both sides of the keel, their rear edge flush with the step.

If you have a set of Edo floats on your light-plane, but haven't the boosters, get in touch with the Edo Corporation. It is distributing a special kit for booster installation.

Corporation Aircraft Owners Association

CAOA is a new organization recently incorporated on a non-profit basis in New York for the purpose of promoting the aviation interests of industrial and business firms who are operating private aircraft for passenger and/or freight service. Founders were representatives of the American Rolling Mill Co., Bristol-Myers Co., Champion Paper and Fibre Co., B. F. Goodrich Co., Howes Brothers Co., Republic Steel Corp., and the Sinclair Refining Co. Other member firms include Atlantic Aviation, Al Buchanan Drilling Co., Burlington Mills Corp., Corning Glass Works, General Electric Co., Goodyear Tire & Rubber Co., Hanes Hosiery Mills Co., Nat'l Dairy Products Corp., Reynolds Metals Co., L. B. Smith, Inc., United Cigar-Whelan Stores Corp., and Wolfe Industries, Inc.

Each of these companies is operating personal aircraft, and you can bet their interest in aviation is more than idle. They'll be in there pitching for better legislation, improvements in aircraft, airports, and more safety in private flying. CAO membership may be limited to companies and corporations, but the excellent results of this organization will be enjoyed by individual private pilots as well as company pilots.

Chicago Show

PLANE OWNERS who want someplace to go long about the end of February and first of March will do well to take in the 1948 International Sports, Travel and Boat Show in Chicago. The big show will be held in the twin Navy Pier exposition halls on the Windy City's downtown lakefront. It'll be plenty worth seeing ... and with Chicago's profusion of airports for the private pilot, there ought to be a good turn-out of airmen.

Goodyear Trophy Race

GOODYEAR TIRE & RUBBER CO., sponsors of the yearly Trophy Race for "light" aircraft at Cleveland, have come out with a booklet listing specifications that will govern construction of 190 cubic inch class airplanes for the 1948 race. These specs have been approved by the Professional Race Pilots Ass'n and by the Nat'l Aeronautics Ass'n. Changes from the 1947 specifications are few, but if

you are one of the pilots after the golden fleece of that race, you'd better get a copy of that Goodyear booklet and make sure your ship meets all the requirements. Major change involves vision requirement. Field of vision of 240° must be provided in a horizontal plane from the pilot's normal sitting position.

Inquiries concerning the Goodyear event at the Nat'l this year should be sent to the Professional Race Pilots Association, 2500 West 73 Street, Los Angeles 43, California.

AT-6 Production

WHEREVER men fly (and women, too) the fame of the North American AT-6 is widespread. So much so, in fact, that the Texan is now being built in five foreign countries. Latest on the list is Holland. Under a licensing agreement between North American and the Netherlands gov't, the AT-6 Texan will go into production for the Netherlands Air Force. This ship is now a standard trainer for Sweden, Canada, China, Brazil and Holland. More than 15,000 Texans have been built since the series started back in '35.

New Engine

CONTINENTAL'S new C-145 aircraft engine has passed its CAA tests, and type certificate T-253 has been issued. The new engine is a six cylinder one, rated at 145-hp at 2700 rpm, and is the ninth model in Continental's line of horizontally opposed aircraft engines. It'll be the powerplant of two new four-place planes to be introduced within a short time.

Lightplane George

ENGINEERS at Westinghouse have come up with midget automatic pilot for personal planes. With this gadget installed in your plane, a simple twist of the wrist maneuvers your ship through the skies with speed and accuracy. Weighing only 35 pounds, the new Westinghouse autopilot is unaffected by rapid maneuvers and high rates of acceleration, thus making it usable on military planes as well as personal aircraft.

A fingertip "control stick" on the autopilot unit governs the attitude of your plane. Pushing a knob in or out causes the plane

AUTOPILOT, midget-size, has been developed by Westinghouse for all-size planes



to dive or climb; while turning the knob left or right swings the plane in the desired direction. The pilots commands are conveyed to three tiny gyro wheels which speedily flash the message to the rudder, ailerons or elevators via electric motors.

Airport Safety Campaign

THE NAA'S yearly survey of the nation's airports for the purpose of awarding Good Operating Practice Certificates has been completed, and the valued certificates have been awarded to 433 airports and seaplane bases throughout the country. Pennsylvania leads with 63 certificate winners, Nebraska ranks second with 56 and Connecticut third with 37.

If your airport did not qualify for a certificate, why not make the necessary improvements and then re-submit your application? It's all okay with the NAA . . . and it'll be a feather in your pilot's cap to be operating an A-1 airport. What's more . . . you'll do more business.

New Books

EDITOR'S BOOK SHELF proudly displays some new books that'll be of interest to personal pilots in particular and all aviation enthusiasts in general. "Techniques of Observing the Weather," by B. C. Haynes is a John Wiley & Sons, Inc., book that sells for \$4. All amateur weathermen (and who isn't?) will want a copy of this authoritative book on weather observations methods. It's easy to read, fun . . . and very instructive, too.

Another book you won't want to miss is Duell, Sloan & Pearce's "Flying Minute Men," by Robert E. Neprud. This book is the story of the Civil Air Patrol, a group of civilian flyers that set an example for civilian participation in a combat effort that has never been matched. The story of the CAP is one of great danger and sacrifice, courage and accomplishment. Get a copy for good reading, \$3.

All the aviation world knows "Janes, All The World's Aircraft," and the new 1947 edition, published by MacMillan, is more of the same and better. The 1947 edition brings you up-to-date on jet programs, military aircraft, and nations' commercial aviation developments. Even Russia is included, although there isn't too much info available from behind the Iron Curtain. What has come out, however, is included in this 1947 edition of Jane's. \$20 a copy . . . and well worth it because of the complete-in-every-respect coverage of aviation.

Personnel

FLYING FARMER prexy Forrest Watson recently took delivery of a new deluxe model Temco Swift . . . Lewis A. Rodert, NACA aeronautical engineer, was announced the winner of the Robert J. Collier Trophy, nation's highest aviation award. . . . The Aircraft Industries Ass'n announced election of three new vice presidents and one new member of the Executive Committee of the AIA. The new vice prexies are William M. Allen of Boeing; J. Carlton Ward of Fairchild Engine and Airplane Corp.; and Leland D. Webb of AIA. J. Carlton Ward Jr., was elected to Executive Committee, succeeding T. Claude Ryan of Ryan Aeronautical.



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Everybody knows that the Ercoupe is spin-proof,* making it the world's safest airplane. They also know that this proven cross-country plane operates in winds that ground other light airplanes. The Ercoupe always was versatile. Now, with increased power and speed, the *improved* Ercoupe is more than ever the world's most useful airplane. The 85 h.p. engine will pull you at better than 110 m.p.h., giving 22 miles per gallon of gas. The larger nose wheel makes possible landings on softer, rougher fields. Greater weight allowance permits more capacity. Now, 2-way radio is included as standard equipment. Now, landing lights, blind flying equipment and other extras can be factory installed at slight additional cost.

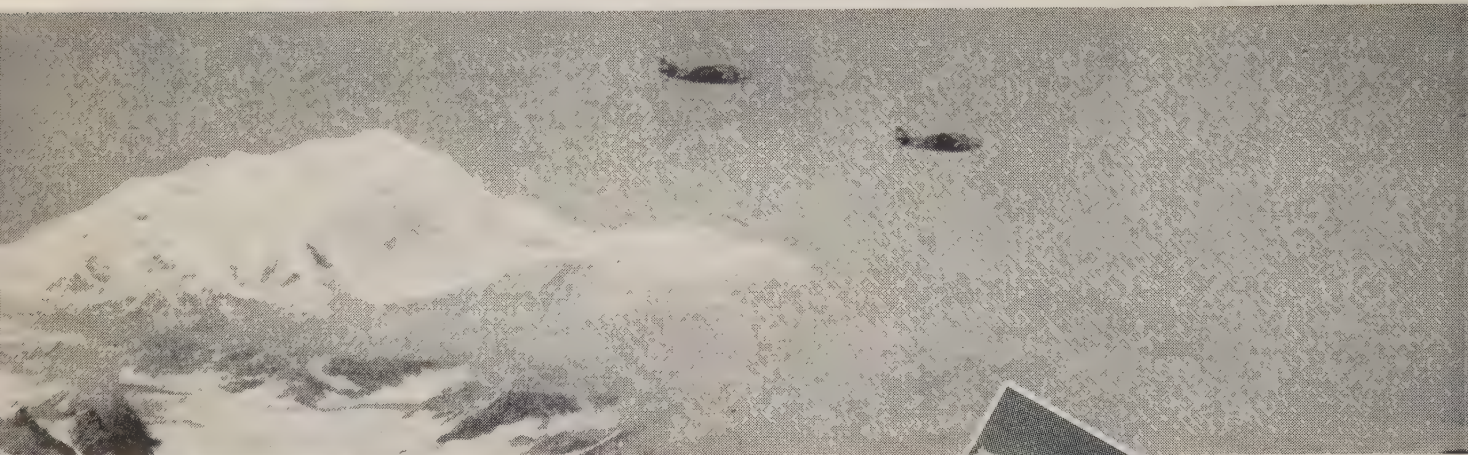
By all means, make it a point to fly in the *improved* Ercoupe . . . You'll soon see for yourself why it's the world's most talked about personal plane.

*The only airplane certified spin-proof by CAA

Tomorrow's Plane—TODAY

For further information, see your dealer—or write to
SANDERS AVIATION, INC. • Riverdale, Maryland
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Our Defenses Are Down



By IVIN M. WISE

THE United States is wide open to air attack from central Europe via the North Pole and with the present state of development, no adequate defense is possible.

To those who shrug off our latest diplomatic failures with Russia and to those who measure our national security in terms of distance, it will be a shock to learn that there is *nothing* to prevent a large formation of hostile bombers from appearing over vital American targets. (*See Polar Chart.*)

That such an attack is entirely possible and that such an attack *could* destroy our potential to even retaliate is known and understood by our military leaders and they are worried. Many attempts to warn us of this situation have been made by military officials, but perforce their statements had to be cautiously cloaked in subtle phrases and this important point may have been lost.

Behind the diplomatic language used lies the warning that the air route from Chicago or Detroit to Europe is shorter than the "great circle route" from New York to London. With this in mind, Air Force publicists announced that bombers of the B-36 type are capable of carrying huge loads of bombs for distances of 10,000 miles. This would enable a similar bomber to take off from a base on the Eurasian continent, (*Continued on page 44*)



MOUNTAINOUS ARCTIC, with the U.S.' present lack of defensive power, could be open door for attack. We are babes in the woods as far as Polar operations are concerned, while the USSR is schooled in Arctic ways

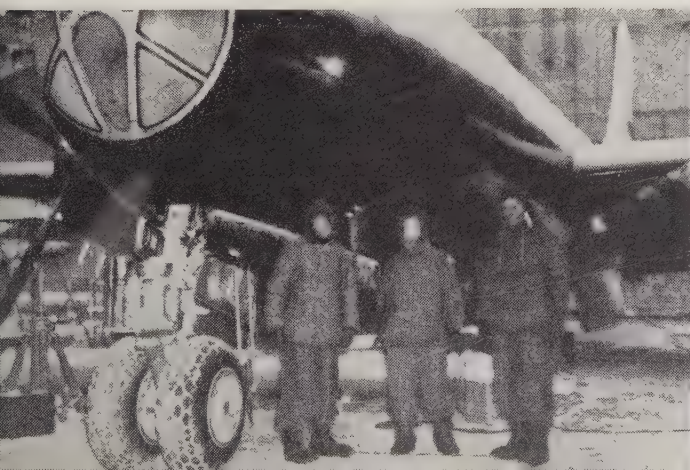




BASE MAP © RAND MACNALLY & CO., CHI

AIR ROUTE from Europe via Polar regions is shorter than the Great Circle route from New York to London. The Polar chart (above) shows clearly the vulnerability of the heartlands of the U.S. to attack that could come via North Pole. Ice, cold cannot stop bombers

MILITARY minds realize time may be short. Therefore experimentation in Arctic operations has begun. Climatic Hangar at Eglin (below) is a beginning, so are air bases in Alaska, but road to accomplishment is long



SKYROCKET



AT California's Muroc Dry Lake, Douglas Test Pilot Johnny Martin will charge

By VICTOR BOESEN

aloft in a new flying machine designed to ram deeper the hole into the sonic barrier started by Gene May in the Douglas *Skystreak* a few months earlier.

While the *Skystreak*, a flaming red stub-winged torpedo, looked the part of the role she performed, this new vehicle . . . the *Skyrocket* . . . a lily white dart 45 feet long by 25 at the wing, is an even finer piece of type-casting, both as to exterior appearance and inner capacity. The *Skyrocket* is built to go faster, and looks it.

The spear sticking forward out of the nose, and the swept-back wings and tail remind one of a humming bird or a swordfish. But these are not merely the accoutrements of illusion. That spine on the snout is the very important pitot tube, fixed in this position to cut down resistance. The back-sweep of the wings and tail is reported to give about 50 mph more speed. There is no bubble whatever in the glass over the pilot's compartment, thus

leaving the ship's clean lines unbroken; and the air intakes for the jet engine are unobtrusive

gills on either side just forward of the wing.

To take the fullest advantage of these aerodynamic innovations, a rocket engine is teamed up with a jet power plant which alone drove the *Skystreak*. The jet motor by itself in the *Skystreak* wasn't enough, but the two in combination as in the *Skyrocket*, are a novelty, and between them are expected to drive the *Skyrocket*, the first self-sufficient sonic research ship ever built, well into the considered-to-be-fierce-but-now-wondered-about turbulence lying somewhere between 600 and 900 mph.

That alone is what the *Skyrocket* was built for . . . to explore this wilderness of violence and bring back to earth some answers to its mysteries. This is not a speed ship *per se*; it is a research ship—speed is important only in so far as it serves the primary purpose.

Chief Engineer Ed Heinemann and his fellow scientists at Douglas' El (Continued on page 46)

SKYROCKET was designed to be faster than *Skystreak*. Swept-back wings, tail are reported to add 50 mph



One - Man AIRPORT



AIRPORT OWNER Bill Putnam is a veritable one-man gang, being boss, mechanic, flight instructor, bookkeeper, gas man and reception committee all in one. His field is located at Twenty-nine Palms, Calif.



By BILL PUTNAM

As told to Don Downie



FLIGHT INSTRUCTION has Putnam's Cub in the air an average of 7 hours a week. Last year he soloed 15 students

THIS airport isn't on the map. Where'n'll am I?"

At least once a week some transient pilot will land at my little 80-acre airport in the desert and ask how to get home. I sell him a few gallons of gas, profit 7 cents per gallon, and then send him on his way again.

Lost, strayed, or air-weary visitors make up most of the excitement around a one-man airport, but it has one great advantage. I can cuss out the boss every morning and always get away with it, for I'm the boss, mechanic, flight instructor, bookkeeper, runway smoother-upper, gas man and reception committee all in one.

I've had the "open for business" sign up along the highway for a year now, but I can't say that my little field has been a complete financial success. Of course "The Missus," the three youngsters, four cats, six dogs and I are still eating regularly, but that's about all. That \$2,000 income in

a full year doesn't add up to as much as I'd get if I were out digging ditches for a living, but at least it's a start and next year can always be better, I hope! And anyway, I'm having more fun.

The big thing wrong with running an airport all by yourself is that you never get anything really completed. For instance, I'll be up in my one Cub instructing a student and a visitor will land for gas. I've got to cut the lesson short, land and pump fuel. When I'm doing much needed maintenance on the plane, a car load of potential passengers will drop in for a ride. Then the soft, sandy runways usually need smoothing off, the wind mill for the water well and the gasoline-driven light plant need fixing, and the darn books never balance! If I'd just been born twins, things would be so much easier.

In spite of the headaches, I like it here, and wouldn't trade places with anyone. Well . . . *almost* anyone. When I was teaching flying for the Army during the war, I was stationed here in Twenty-

FIELD is just an hour's flying time from Los Angeles, and so weekends find Putnam busy welcoming aerial guests



nine Palms, California. My wife and I found out then that we liked the wide open spaces, with no neighbor's radio shouting down our necks, and so decided to stay. We bought our 80 acres, including house, bunkhouse, hangar, well and light plant, for \$6,600—all the money we had in the world. So after my hitch ferrying pursuit planes for ATC, we all came back out to the desert to live.

Life on this desert airport is never really dull. There is some gold mining activity nearby and I've flown prospectors hunting for lost mines, searched for missing hikers, and shown the beauties of the desert to real estate prospects. One gold mining official flew for two hours over three gold mines that he owned, checking from the air the best way to haul ore to a centralized mill.

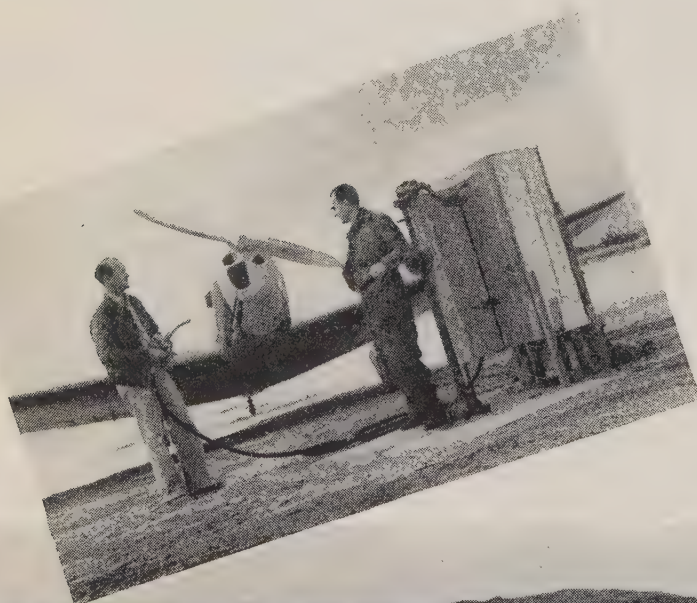
I've searched for two lost geologists and a missing airplane this year. One of the geologists was a

local resident who was out hunting geodes. When she failed to return, friends asked me to go out and find her. She was stuck in the sand on the edge of a dry lake 15 miles from my field. I landed in a 40-mph wind, found out that she was all right, and sent a tow truck to pull her out.

In the past year, I've soloed over 15 students. The little *Cub* flies only an average of 7 hours a week, but profit from that very nearly keeps the family eating. My rates are the same as those in larger towns, \$8 per hour solo and \$11 dual. Since I own the airport, the only overhead is taxes, and I don't have to take in as much money as I would were I operating in town.

There is some extra profit above flying time. I pump about 100 gallons of gas per month to transients. The bunkhouse usually has overnight visitors from Los Angeles every weekend and I get 50 cents per cot per night. A nearby dry lake is ideal for flying sailplanes and many soaring pilots keep their gliders on trailers at my field rather than tow them 150 miles from Los Angeles each weekend. I collect \$2.50 per month for trailer space. Sunday morning breakfasts bring in a little additional revenue, but as at most airports, Sunday is the busy day of the week and there just isn't too much time available to spend on cooking.

In the summer it gets hot, really hot. Many residents move to the seashore, and those who remain usually fly between 5 (Continued on page 51)



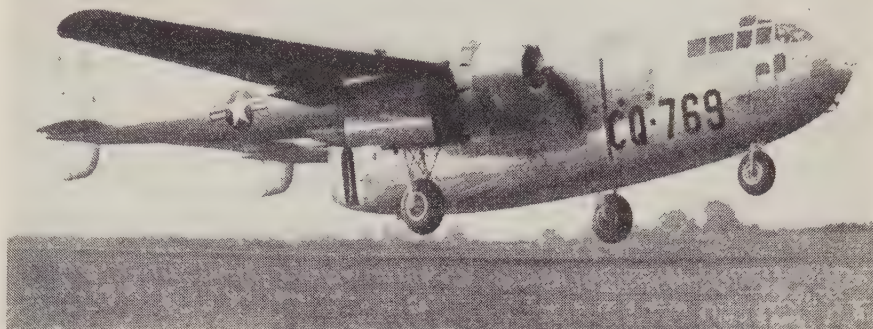
EVERYONE pumps gas. Here a Fairchild owner mans the pump while Putnam handles the hose. This desert field is known as a "K" airport because of the angle of the strips. The longest runway is just a half mile long



AVITRUC, a new all-metal assault glider designed for airborne operations by the Army, is said to be the largest ever produced in the United States. This new glider is 53 feet long, has a wing span of 86 feet, a gross weight of more than 7 tons. Designated the XCG-18A, the *Avitruc* had its first test flight recently at Mercer Airport, Trenton, New Jersey. It was built by Stroukoff.



NEWEST FLYING BOX-CAR, a version of the Fairchild *Packet*, offers changes in design that result in its flying faster and farther than the original model. Designated the C-119, the new *Packet* carries a 9-ton cargo 2,000 miles at a cruising speed of 200 mph, an increase of 25 mph over its predecessor. Most noticeable difference between this model and the old is the new nose.

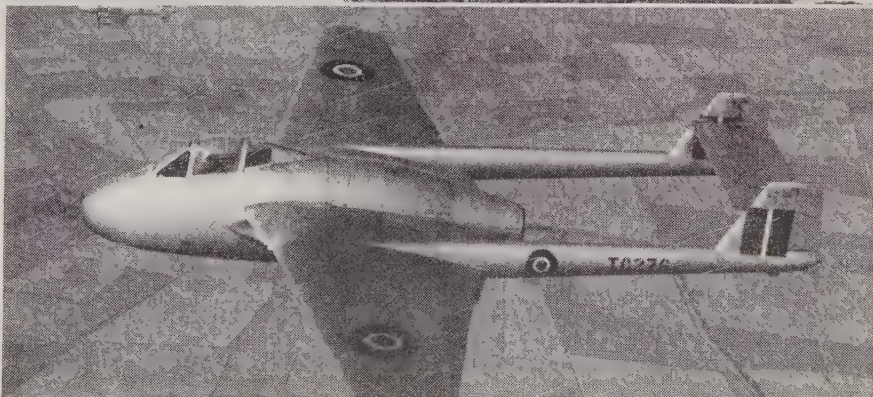


NEW... on the wing

SEAPLANE version of the Percival *Proctor*, one of Great Britain's popular personal planes, has recently undergone successful flight tests prior to its licensing for water operations. The *Proctor* is a four-placer powered by a Gipsy Queen series 13 engine. Several different versions of the *Proctor* are being used as radio, navigational, and communications trainers by Royal Air Force.



VAMPIRE, one of U.K.'s top-ranking jet fighter planes, is now being powered by the Rolls Royce *Nene*. This new jet power unit has made a slight change in the configuration of the *Vampire*: no longer is it necessary to have two large air intakes on top of the fuselage. The *Vampire* is used by the RAF, the Swedish Air Force, the Australian Air Force, and a few by the Swiss.



... and

**Pilot ticket requirement is to know
how to spin a ship, recover from it**

By D. N. AHNSTROM

ON a trip to an airport recently, your correspondent and a friend got themselves well wound up in a hangar session. The weather was bad, the planes were all tethered, and the pilots and budding pilots were lumped in the lounge room batting 400 in the hot stove league. The room was thick with aeronautical slangage, sweeping motions descriptive of airplane maneuvers, and arguments for and against this plane and that.

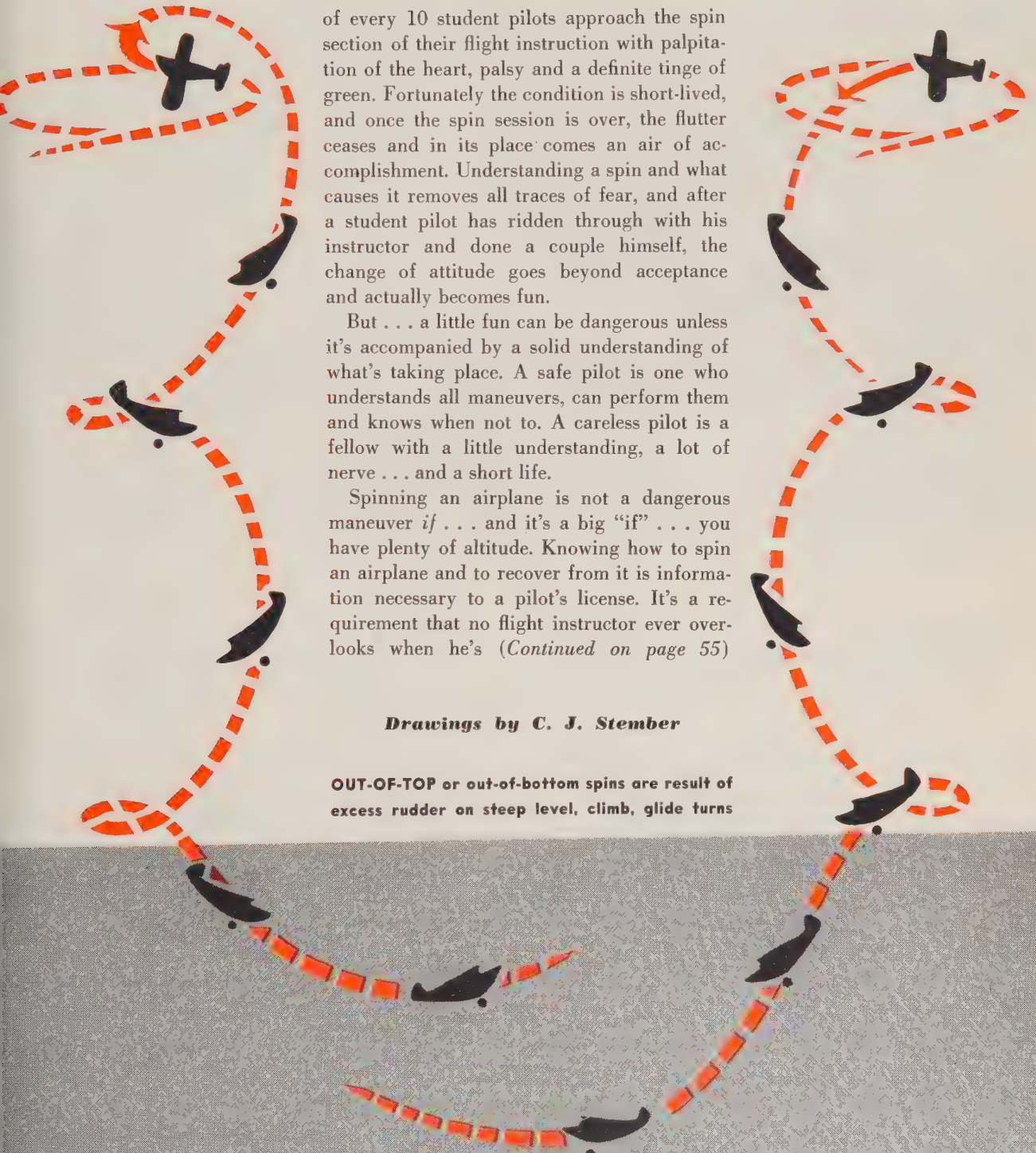
Then the subject of spins came up. To spin . . . or not to spin, posed by a student pilot who admitted that mere mention of the word made him dizzy. So dizzy, in fact, he'd scorned flight training in a ship of conventional control and had signed up for instruction in a two-control. Having no rudder control, a two-control plane can't spin. We aren't going to choose up sides here on that question of two-control versus conventional, but we would like to take a bit of the shroud off that spin bugaboo.

Spinning an airplane has been a fearsome fact in the minds of beginner pilots for years. Nine out

NORMAL or intentional spin is out of a power-on or a power-off stall. Instruction comes soon after solo



around she goes!



of every 10 student pilots approach the spin section of their flight instruction with palpitation of the heart, palsy and a definite tinge of green. Fortunately the condition is short-lived, and once the spin session is over, the flutter ceases and in its place comes an air of accomplishment. Understanding a spin and what causes it removes all traces of fear, and after a student pilot has ridden through with his instructor and done a couple himself, the change of attitude goes beyond acceptance and actually becomes fun.

But . . . a little fun can be dangerous unless it's accompanied by a solid understanding of what's taking place. A safe pilot is one who understands all maneuvers, can perform them and knows when not to. A careless pilot is a fellow with a little understanding, a lot of nerve . . . and a short life.

Spinning an airplane is not a dangerous maneuver *if* . . . and it's a big "if" . . . you have plenty of altitude. Knowing how to spin an airplane and to recover from it is information necessary to a pilot's license. It's a requirement that no flight instructor ever overlooks when he's *(Continued on page 55)*

Drawings by C. J. Stember

OUT-OF-TOP or out-of-bottom spins are result of excess rudder on steep level, climb, glide turns



AUTHOR Ruth Downie reneged on a solo, but finally learned her lessons well. Here she gives an Aeronca a preflight

No Solo, Please!

By RUTH DOWNIE

FLIGHT INSTRUCTION in so many different ships, everything from Cubs to PT-19's, retarded pilot progress



I EY, get back in here! I don't want to solo . . . not yet, that is!"

My flight instructor looked annoyed. In more—he looked aghast and perplexed all at the same time. "Wha-a-t!" he finally gulped. "You mean you don't want to solo? Then why-in-blazes are you taking flying lessons?" He paused only for a breath and continued. "Your landings are OK and you've been looking around nicely. You can handle it and I wouldn't let you go up alone unless I was sure you were ready. Anyhow, there isn't any crash insurance on the plane!"

But I'm not sure of myself in this plane yet. I don't want to bluff my way through any more flying, so get back in here, please!"

The instructor climbed in, disappointed, baffled and completely confused. "You're the first student I've had over 5,000 hours of flying that I've ever had trouble on soloing," he mumbled.

But from my viewpoint; I've been flying off-and-on for over seven years, and I'm just beginning to find out what it's all about. Maybe I'm slow to learn, but I'm just now convincing myself that I can really fly a little. I've never been a professional athlete or a top-flight sportswoman and I have no idea of making a career of flying. I like a home, a picket fence and slippers, just like the so-called "average" housewife, but I also sincerely like flying—just for the fun of it.

Here's why I was in no hurry to solo again. In 1940, I soloed back in the CPT program of 1940; I then passed the flight check for my private license. At first I was scared and rushed all the way through the program. Then I married a flight instructor and soon found myself running the Control Tower at an Army Primary Flight School where he was teaching. From that control tower I saw all the one-headed stunts ever perpetrated in an airplane. So many students groundlooped daily, nosed over frequently and generally bent up Army aircraft.

And if I hadn't seen enough of the rough side of flying from the tower each day, my husband would have invited a group of instructors over for an evening's chat. They'd sit around and bat-the-breeze. Eventually, the bull session would turn to teaching techniques and the near accidents that had happened in the past week.

"That cadet I soloed last week—was he raunchy! I had to turn him loose. He had 12 hours of solo time, and I figured he could stagger around the pattern without skinning up the airplane too badly." Fine confidence-building talk for an up-and-coming student! Since then I've learned that most pilots indulge in such chatter as part of an all-in-a-day's-work attitude, and then forget it. Yet many women listen and get the idea that there is much potential danger every time she rides in a plane. Personally, I think that most pilots do a good job



AIR TRIP from Winslow, Ariz., to Grand Canyon was as rough and turbulent as the cumulus clouds indicate

of un-selling women on flying with their hair-raising stories that usually have little basis of truth.

Along with most other civilians, I did little flying in the post-Pearl Harbor period. On infrequent days off between classes of cadets, we made a hop or two in *Cubs*. One of these resulted in a forced landing on the edge of a dry lake near Baker, Calif., when we were flying a puddle-jumper owned by one of the mechanics on our field. An unsafetied fuel

X-C DELIVERY flight in a *Cub*, with husband at controls, gave author map time, but little pilot time



shut-off valve vibrated to Off position and the little engine quit cold. We got down OK, but again I wasn't too eager to fly.

When my husband got back from "the Hump," we spent his first leave on a 30-day trip from Los Angeles to Seattle, Washington, and back in a little *Cub Coupe*. He did his best to coax me to fly it, but I'd just as soon play at navigating, watch the scenery roll by and let the other half of the family do the flying. I'd take the controls when he wanted to stretch a bit or check a map, but the minute he picked up a magazine from the bulging baggage compartment, I quit flying. I learned a lot in that 40-hour trip, but none of it really helped me to solo again. It proved the value of safe, sane and cautious flying that most trained instructors preach, but it also made me require more precision in my own flying. I finally got past the point of looking at each field as a possible forced-landing site, and that made trouble for me later on when the instructor kept giving me simulated forced landings.

Nearly every weekend when we could beg, borrow or promote an airplane, we'd fly somewhere, but we'd nearly always take a different type plane. Just when I'd reach a point where I could land a *Cub* with some degree of proficiency, we'd take a Fairchild PT or a Stearman or a Vultee Basic Trainer. Did you ever try to land a BT when it felt like a 10-ton truck as you brought it across the end of the field?

The next summer we ferried a new *Cub* trainer from the Pennsylvania factory to California. (See



PILOT'S TICKET finally won, Mrs. Downie gave in to husband's persuasion and delivered a Cessna with him

SKYWAYS, May, 1947, "Flight Without Funds" by Don Downie.) I should have soloed out on that trip. The little plane was easy to fly, my husband is a good instructor and we had decent weather most of the way. But it was so much more fun to sit back, check the maps and watch the United States roll by. I flew a little, but when I was supposed to make a landing I always found an excuse. Maybe it was because I didn't want my husband to find out just how much flying I'd never learned. Besides, he could do it so easily, and I had to work at it so durned hard.

Perhaps women in airplanes are similar to women in automobiles; they like to go along for the ride, but they'd rather sit back and enjoy the scenery than buck the traffic or (Continued on page 48)

FLIGHT MASTER Jim Most of East Los Angeles Airport rode many a righthand seat with the doubting Mrs. Downie



AIR FORCE



OUR mission in the Air Force is to be prepared to provide for our national security through the medium of Air Power. To accomplish it we must build a peacetime Air Force of maximum efficiency in a minimum of time.

"Our program calls for (1) an air force-in-being composed of 70 groups reinforced by 22 separate and specialized squadrons; a force requiring 401,000 men and 15,000 aircraft; (2) a strong reserve; (3) a research and development program second to none; and (4) air industrial preparedness that provides for minimum peacetime requirements and rapid expansion in case of war."

General

Chief of Staff

U.S.A.F.

WHY WE NEED A



PEACE TALKS with Japan did not prevent Pearl Harbor. If we continue unprepared, another Pearl Harbor is possible

By Representative

Vice Chairman Congressional Aviation Policy Board

IN THESE sorely troubled days when we very evidently are embroiled in a "cold war," with the diplomatic battle lines drawn in every part of the earth, it seems almost childish to question the need for a strong Air Force.

It has become so obvious that, for the present at least, the possession of the most efficient, most modern and potentially the hardest hitting air weapons is our best protection of the peace that it scarcely seems necessary to state the fact. And yet, there are among our citizens those who still believe that a "soft answer turneth away wrath" and that the olive branch is more effective than the atom bomb. It was that sort of thinking that made Pearl Harbor possible and that could make an infinitely more disastrous "Pearl Harbor" a certainty if we pursued it to its logical conclusion. There are some nations—those in the grip of a totalitarian ideology—who understand nothing but strength. It is impossible to deal with them on

anything like even terms unless you carry a big stick and keep it in plain sight all the time.

Although we know little about the size and strength of the Soviet Air Force, or just how far it has progressed in the development of new and more powerful planes, we do know that the Russian government has many of the German scientists working for it; that a billion and a half dollars has been allocated to air research alone in the current year's

budget and that much of this money is being spent on jet aircraft which are well advanced. We know also that there has been development of great air bases in Siberia, with a complete network of communications and weather stations and all the necessary industrial establishment to support them. Since there is no nation which could conceivably be strong enough to be considered a threat to the Soviet except the United States; and since all the diplomatic thrusts of the cold war are aimed directly and openly at us—

REP. CARL HINSHAW has been
Member of Congress since 1940



STRONG AIR FORCE

AIRMAN at right represents the peak strength of our Air Force (March 1944). Personnel totalled 2,411,294

since, with the exception of Canada, we are the only close neighbors to the Far Eastern section of Russia—the conclusion again is obvious. Our own defenses in Alaska, on the other hand, are woefully inadequate.

By the time this article appears in print, the President's Air Policy Commission will have reported to the President and he, in turn, will undoubtedly have sent its recommendations for a powerful air defense to the Congress. Shortly afterwards, on March 1st, the Congressional Aviation Policy Board will make its own recommendations and will urge legislation to implement them. Then it will be the task of Congress, with the world situation in mind, to decide just how much of the national income we can safely allocate to rebuilding a first class air force. With the so-called Marshall Plan for the recovery of Europe asking many billions for its own part of the world defense against communism, the decision will be a difficult one. That the Congressional Aviation Policy Board realized just how difficult that decision would be is evidenced by the fact that its first public statement, made last December, warned the members of Congress and the people that "vastly enlarged appropriations" would be necessary for our defenses.

It is well to review a few of the factors which led to that statement of the Congressional Board. At its peak of power, between July, 1944, and August, 1945, our Air Force had a total of 79,908 active aircraft of all types. This total included 43,428 first-line planes, arming 243 combat air groups, with 223 of these groups overseas. In August, 1945, we had 2,865 very heavy bombers (B-29's). The peak strength in personnel was (*Continued on page 50*)

AIR FORCE today totals only 324,095 men. Program calls for 401,000 military personnel and 150,000 civilians for the 70-Group AF





RESEARCH. study of aircraft operation goes on at Eglin Field



NACA continues study of engine operation under arctic conditions



WIND TUNNEL testing helps formulate designs, plans for tomorrow's planes



TECHNICIANS for the air force are being graduated from technical schools, but the need is for thousands more

USAF — Design for

The Air Force's Five-Point Program is designed to give U. S. air security

By ALICE ROGERS HAGER

AIR Power has been defined by General H. H. Arnold, Commanding General of the USAAF in World War II, as "the total aviation activity—civilian and military, commercial and private, potential as well as existing." To this, his successor, General Carl Spaatz now Chief of Staff of the USAF, has added: "The phrase, 'total aviation activity' is all-inclusive—the trained air personnel; the aircraft industries; and the air-conscious public."

"The third component," General Spaatz continues, "public support, is as essential to effective Air Power as industries, airplanes and airmen. Public support determines the rate of translation into action of the airman's faith, the conviction that ability to control the air is essential to victory in the time of war, and equally essential to prevent war in time of peace. We know the penalty paid by Germany and Japan for their failure to control the air over their own territories.

"It is our role to spread faith in Air Power as an essential means to prevent war, not only for the United States, but for all civilization."

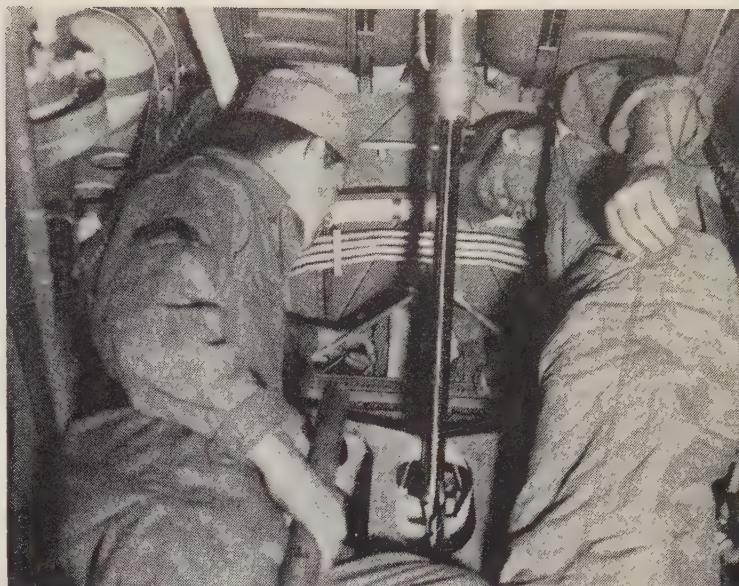
Although the General spoke those words to the last convention of the Air Force Association, he was—in reality—speaking them to all thinking citizens of the U.S. For months now, SKYWAYS has been devoting its editorial space to the plea for a strong Air Force, for the implementation of the faith which the General invokes. That there can be no doubt of the seriousness of that invocation, we need only remember that President Truman, in calling together his Air Policy Commission last Fall, told them to report by the first of this year, because of "the urgency of the situation."

This article is in the nature of a report as to the status of our Air Force, and the plans it hopes to carry out for the maintenance of security.

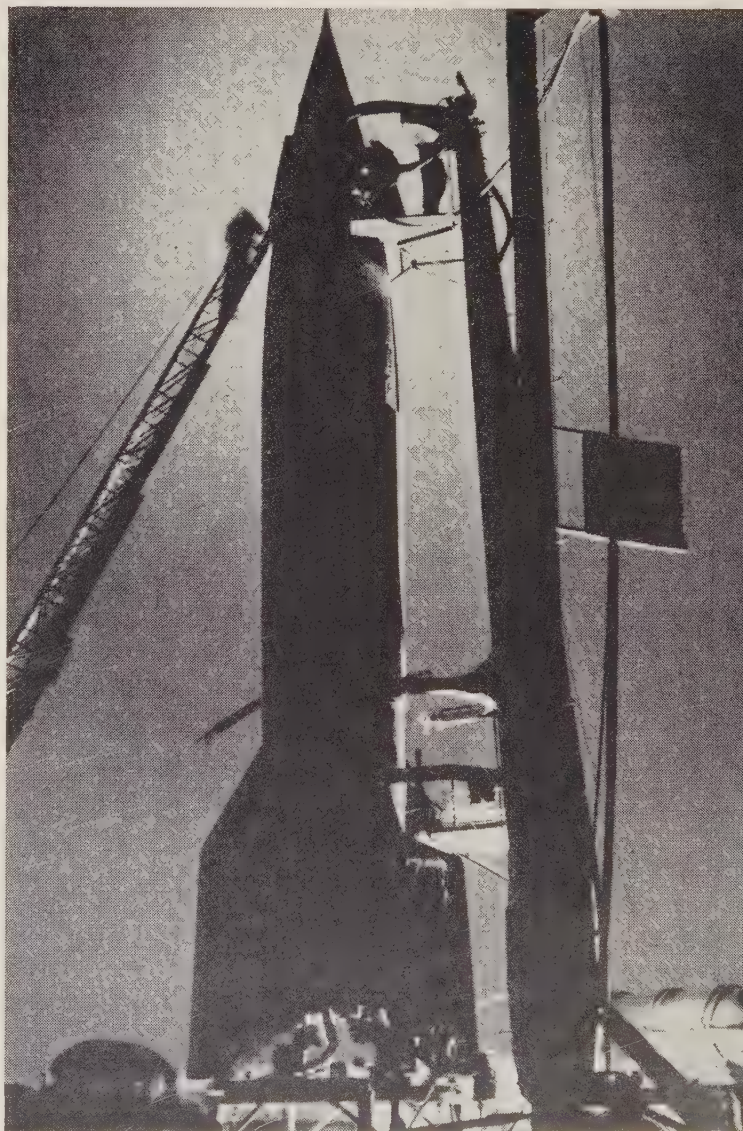
The minimum peacetime requirements for national defense have been set up as a Five-Point Program by the Air Force planners:

- 1—An autonomous Air Force co-equal with the Army and Navy in a unified defense organization;

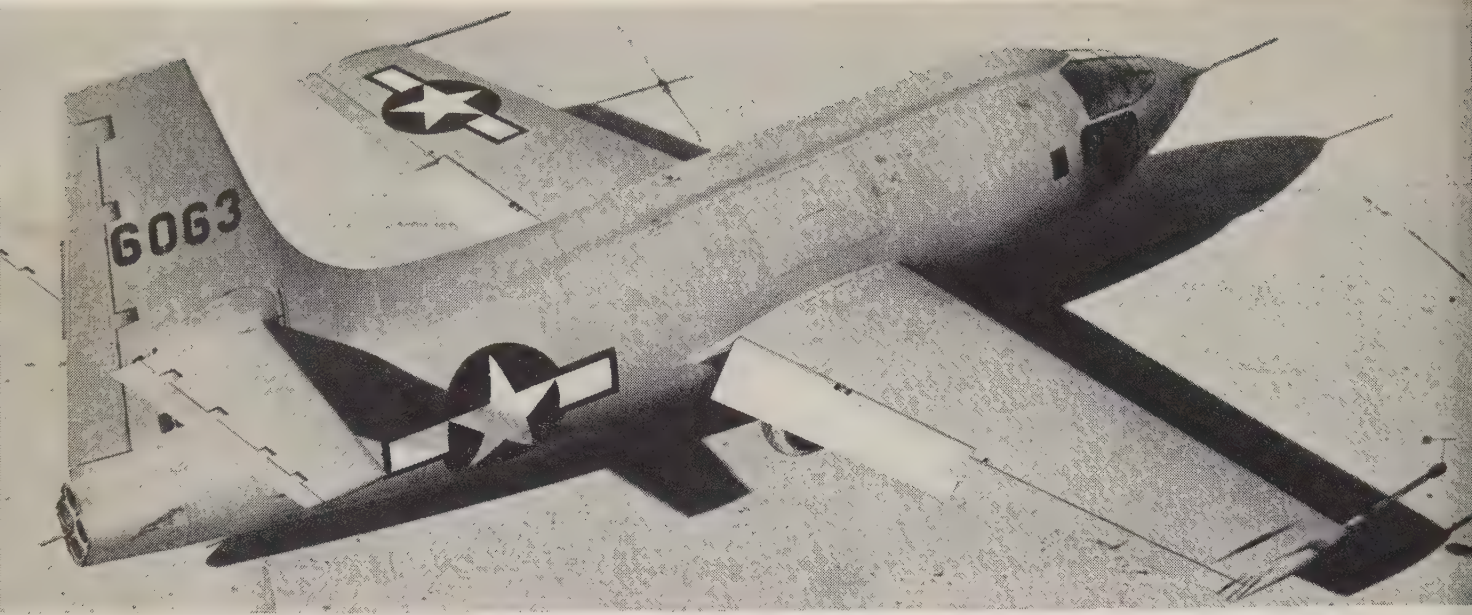
(Continued on page 47)



AIR FORCE-IN-BEING requires formation of units that are equipped, trained and ready to go into action on moment's notice. Behind this must be research, development program to increase effectiveness of weapons



Security



SUPERSONIC-SPEED research rocket-planes for AF are Bell XS-1 (above), XS-2, Douglas XS-3 and Northrop XS-4

Sonic-Speed Air Force

***This material was especially prepared
for SKYWAYS magazine by U. S. Air Force***

WORLD WAR II provided the impetus for a tremendous technological advancement in the field of aeronautics which resulted in the creation of more complex aerial weapons and equipment, and widened greatly the scope of research and development.

Prior to the war, for example, we were concerned mainly with only one type of power plant—the reciprocating engine. Today, as a result of wartime developments, the Air Force is working on five additional types—the gas turbine, or turbo-jet, for jet propulsion; the gas-turbine for propeller drive; the intermittent jet, which is similar to the one used by the Germans in the V-1 buzz bomb; the pure ram-jet; and the rocket motor. The Air Force also is investigating the possibility of utilizing nuclear energy for propulsion purposes. Electronics, too, is still a virgin field which demands a great deal of further research if its many potentialities are to be fully realized. Guided missiles, which may be destined to play a major role in a future conflict, require further intensive study and development.

Our experience in World War II emphasized the fact that modern war rests upon scientific research

because military quality is as important as military quantity. The highly scientific nature of our future weapons makes it mandatory that the scientific talent of the United States be utilized to the greatest degree.

A scientific organization has been established in our National Defense set-up and in the Air Force. The National Defense Act of 1947 established the Research and Development Board which is now headed by Dr. Vannevar Bush to coordinate the research and development activities of all three departments of the armed forces. In the Air Force, the Scientific Advisory Board, composed of 30 of the leading scientists in aeronautical fields, has been created to advise the Chief of Staff on the Air Force Research and Development program.

In addition to these organizations which utilize scientific personnel, the Air Force awards study or research contracts to various civilian universities, research laboratories and other non-profit institutions to investigate specific fields where data is lacking. The Air Force is attempting to maintain the closest possible liaison with civilian scientists in this country, for only (Continued on page 52)

OPERATIONAL—

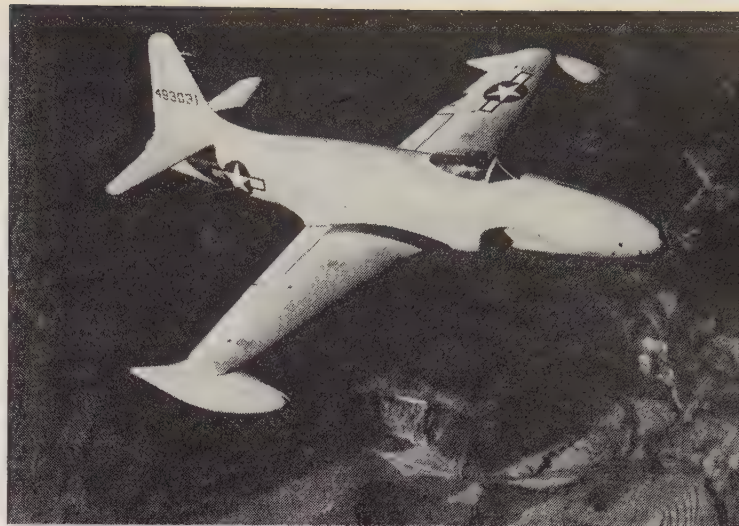
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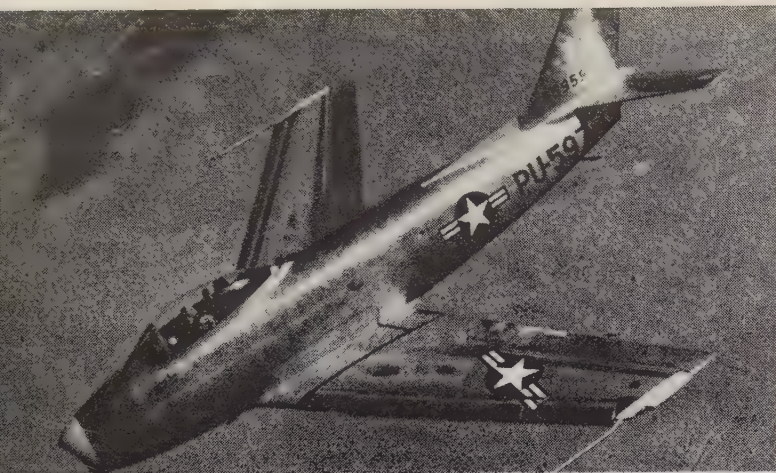
LOCKHEED P-80B This model of the *Shooting Star* is faster, has better armor-plate and faster firing guns than the P-80A. Powered by an Allison-built super turbo-jet, the P-80B is capable of speed greater than 600 mph. A water-injection system in the power plant increases the ship's take-off and climb performance. The B features a pilot ejector seat, and radio masts and antenna wires enclosed in pilot's canopy. The fuel used in the P-80B is kerosene because it provides more energy per gallon.

NORTH AMERICAN P-82 The *Twin Mustang* is exactly what its name suggests: two *Mustang* fuselages joined together. Powered by two 12-cylinder Allison V-1710 engines, the P-82 has a top speed near 500 mph, and a range of more than 2,500 miles. It has a rate of climb of over 5,000 fpm. Designed as a fighter, the P-82 is easily converted to a long-range bomber by bomb racks under the wing section. Both cockpits of the ship are operational, so that pilots can spell each other at controls.

REPUBLIC P-84 Called the *Thunderjet*, the P-84 is another 600-mph-class jet fighter plane. Powered by an axial-flow General Electric (J-35) jet unit, the P-84 is actually a jet-propelled offspring of the World War II P-47 *Thunderbolt*. Unlike other jet planes being built for the Air Force, the P-84's air intake is in the nose rather than on the sides. The *Thunderjet* has a range of about 1,000 miles. Like the P-80, the *Thunderjet* also features a pilot ejector seat for a quick get-out in cases of emergency.

BOEING C-97 The Air Force's new transport is a cargo counterpart of the well-known B-29. A twin-deck ship, the C-97 has a fuselage that is 110 feet, 4 inches long and is capable of carrying more than 100 fully equipped troops a distance of 3,500 miles. The big plane has a wing spread of 141 feet, 3 inches. Powered by four Wrights or Pratt and Whitneys, the C-97 is reported to have a top speed of a good 400 mph. The entire fuselage of the -97, except for the tail storage section, is pressurized.





IN PRODUCTION— Not Operational

NORTH AMERICAN P-86 Called the “first swept-back fighter plane,” the P-86 is a super streamlined jet plane for the Air Force that is reported to be capable of speeds “in excess of 600 mph.” It has 1,000-mile range and 40,000-foot ceiling. In the photo shown here the 86’s extra-large leading edge slots are extended during slow-speed flight (this, for cameraman). The slots are necessary to lower the landing speed of this fast plane to 100 mph.



NORTHROP B-35 The Air Force’s long-range heavy bomber is this *Flying Wing*. The B-35 carries a crew of nine in the pressurized central nacelle. The pilot sits in the forward cockpit, offset to port, while the bombardier is on the starboard side, with the bombing window in the leading edge of the wing. Double-split flaps at wing tips provide the *Flying Wing* its directional control. The bomber is powered by four Pratt and Whitney *Wasp Majors*.



CONSOLIDATED B-36 One of the biggest Heavies on the AF roster is this six-engine B-36. The ship is 163 feet long and has wing span of 230 feet. Pressurized forward and aft compartments are connected by 85-foot tunnel through which crewmen are transported on four-wheel trolley. Powered by six 3,000-hp Pratt and Whitney pusher engines, the B-36 has top speed over 300 mph, a 7,000-mile-plus range, a 10,000-pound bomb load.



NORTH AMERICAN B-45 One of the Air Force’s first four-jet bombers is the B-45. Powered by four GE-Allison J-35 jet units, the B-45 is capable of speeds in excess of 480 mph. The jet units are grouped in horizontal pairs, one pair on each side of fuselage outboard of the tail surfaces. Carrying a bomb load of 10 tons, the B-45 has a tactical radius of 800 miles and a service ceiling of over 40,000 feet. Note the dihedral tailplane.



BOEING B-50 This sleek bomber is the successor of the famed B-29. Powered by four 3,500-hp Pratt and Whitney engines, the B-50 has a cruising speed in the vicinity of 350 mph and a range greater than the '29's. This ship has same dimensions as the B-29 except that the B-50's tail is 5 feet taller. Details regarding performance are restricted at this time, but the B-50 is said to carry a bomb load greater than that of the *Superfort* (20,000 lbs.).

FAIRCHILD C-119 This is the new and improved version of the well-known Fairchild *Packet*. Main improvement is increased power, payload, speed and rate of climb. C-119 is powered by two 2,600-hp Pratt and Whitneys, giving it a speed of about 200 mph. Carrying a 9-ton payload, it has a range of 2,000 miles. Capable of carrying 42 fully equipped troops, plus 20 parachute-cans of supplies, the C-119 stands to be one of the AF's top air freighters.

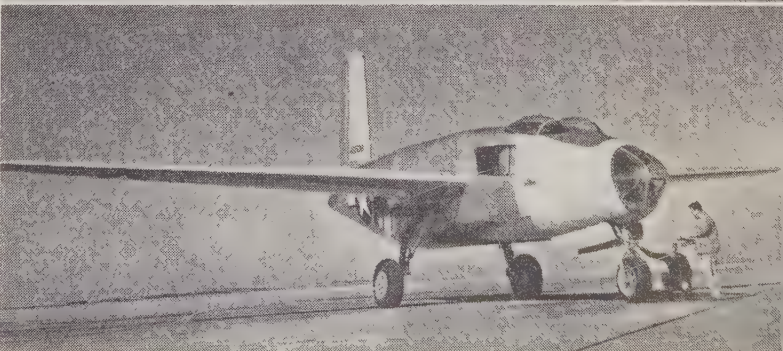
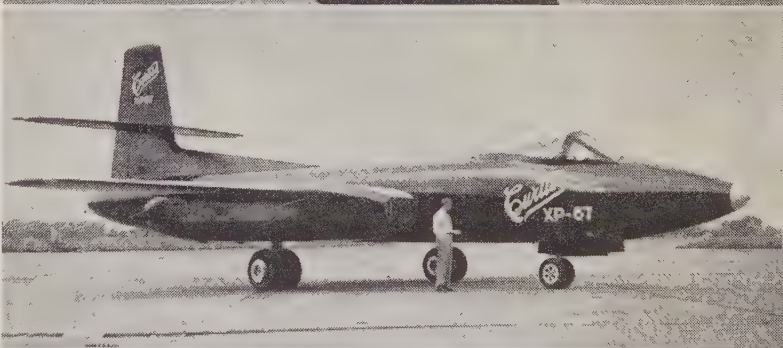
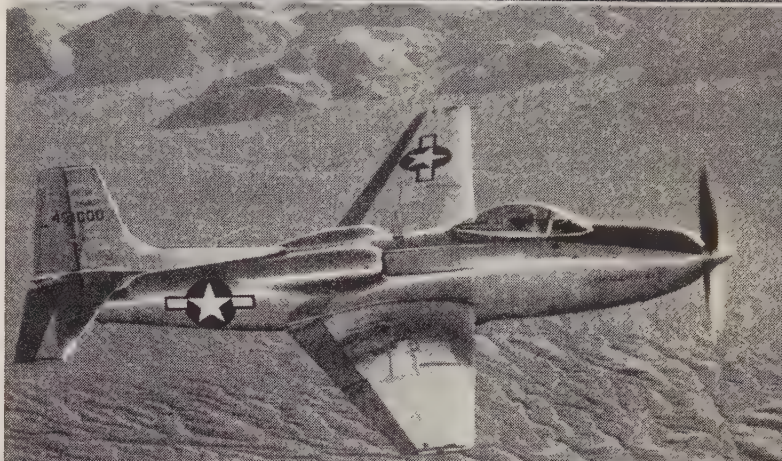
EXPERIMENTAL

CONSOLIDATED XP-81 Called one of the most powerful fighters in the skies, the XP-81 is the first Air Force plane to fly with a gas-turbine engine designed for prop drive. Powered by a GE gas turbine in the nose and a GE jet in the tail, the XP-81 has a speed greater than 500 mph. Both power plants burn kerosene. While each engine operates independently, their combined power is the same as produced by all four engines of the *Superfortress*.

NORTHROP XP-79 Called the *Flying Ram*, the XP-79 is a twin-jet plane in which the pilot rides in a prone position, thus permitting faster maneuvers, more abrupt turns and harder pull-outs. The ship is said to be faster than 500 mph. In the *Flying Ram*, the pilot and Westinghouse jet units are fully enclosed in the wing. It employs a retractable tricycle landing gear and has the same sleek lines of the other Northrop *Flying Wing* designs.

CURTISS XP-87 This Curtiss fighter plane built for the Air Force is a four-jet ship that is operated by a two-man crew. The jet units are built by Westinghouse. This ship was designed to operate under extreme weather conditions, thus it may be one of the first designed to meet rigors of Arctic operations. It has a wing span of about 60 feet and an over-all length of close to 65 feet. Its first test flight was made recently at California's Muroc Air Base.

DOUGLAS XB-43 This ship is the jet version of the XB-42 which was announced during 1947. Powered by two General Electric J-35 axial-flow jet units, the XB-43 has a speed that is probably considerably in excess of the 400 mph listed for the conventionally powered XB-42. Designed as a bomber, the -43 is said to have a bomb load of somewhere around 8,000 pounds. Armament includes remotely controlled guns and nose cannon.





CONSOLIDATED-VULTEE XB-46 Sister ship to the North American B-25, the XB-46 is a four-jet bomber also powered by GE-Allison J-35 units in combinations of two. One of the features of this jet bomber is its exceptionally long needle-like fuselage that is just seven feet less than the -46's wing span. Actually the ship is 106 feet from nose to tail and has a wing span of 113 feet. The four jet engines give the XB-46 a top speed of considerably more than 480 mph, and a combat radius of over 800 miles. This ship has just completed its tests.



BOEING XB-47 The swept-back wing and tail surfaces give the six-jet XB-47 its unusual appearance. Dubbed the *Stratojet*, this bomber GE-Allison J-35 units, each developing 4,000 pounds of thrust. The units are mounted four in pairs slung under the inboard sections of the wing, and one additional jet engine mounted under each wing tip. Over-all dimensions are similar to those of the B-29 *Superfortress*: wing span is about 116 feet, and length 168 feet. Performance figures on the *Stratojet* are not available. It made its first flight recently.



MARTIN XB-48 Another six-jet bomber for the Air Force is this Martin XB-48. Like the Boeing XB-47, it is powered by six GE-Allison J-35 jet units, three in each wing, producing 24,000 pounds of thrust. Carrying a crew of three, the XB-48 has a bomb capacity of 10 tons, a combat radius of 800 miles and a top speed of "more than 480 mph." This bomber has a wing span of 108 feet, is 27 feet high, and 85 feet long. Wings are unusually thin and narrow in conformity with requirements for high speeds. The XB-48 was the AF's first six-jet bomber.



NORTHROP YB-49 Air Force authorities call the YB-49 the "largest jet plane yet built." An eight-jet bomber, the YB-49 recently completed its first test flights at Muroc. Actually the YB-49 is a jet-propelled version of the B-35 *Flying Wing*. It is powered by eight GE-Allison J-35 jet engines, each producing 4,000 pounds of thrust. These units are arranged in groups of four on either wing. Performance figures are not available at this time, but we do know that this unconventional tailless plane is one of the most powerful airplanes ever built and flown.

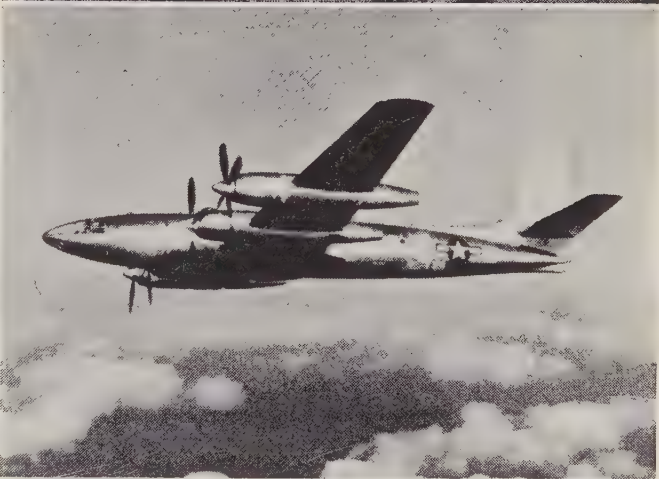
CONSOLIDATED-VULTEE XC-99 The Air Force's largest transport and said to be the world's largest land-based plane, the XC-99 recently made its first flight. Cargo version of the B-36, the XC-99 was designed for a top speed over 300 mph, and a maximum range of better than 8,000 miles. Powered by six 3,000-hp Pratt and Whitney *Wasp Major* engines, the XC-99 is capable of carrying 400 fully equipped combat troops, 335 litter patients and attendants or 100,000 pounds of cargo. It has a wing span of 230 feet, is 19 feet longer than B-36.



HUGHES XF-11 This is the second model of the high-speed photographic plane that crashed with its designer and builder Howard Hughes at the controls. The XF-11 is a twin-boomed, two-place plane that has a wing span of 101 feet and is 63 feet long. It has provisions for six cameras in the nose and booms. Powered by two 3,000-hp Pratt and Whitney engines, the XF-11 is reported to have a speed of 450 mph at 33,000 feet and a maximum range of 5,000 miles. Cabin is pressurized, and each unit of tricycle landing gear carries dual wheels.



REPUBLIC XF-12 Designed as a photo reconnaissance plane, the Republic *Rainbow* is said to be one of the fastest reciprocating engine-powered planes today. The XF-12 has a top speed of well over 450 mph and a service ceiling above 40,000 feet. Powered by four Pratt and Whitney engines (3,500 hp each), the *Rainbow* utilizes exhaust gases by means of a turbo jet in the trailing end of the engine nacelles to add 200 horsepower to each engine. The *Rainbow* has a cruising range of 4,100 miles and air-conditioned, pressure-proof cabin.

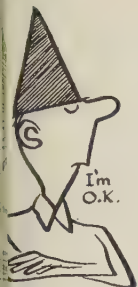


BELL XR-12 Among the list of new helicopters for the Air Force is the five-place XR-12, built by Bell. Powered by a 550-hp Pratt and Whitney engine, the XR-12 has a top speed of 105 mph and a cruising speed of 80 mph. It has a range of 300 miles and is capable of climbing vertically at 450 fpm. The XR-12 will carry a useful load of 1,630 pounds. This helicopter is similar to the commercial Model 42 'copter designed and built by Bell, except that the military version has 100 more horsepower in the horizontally mounted engine.





"Dilbert has tendency to over control . . . !"



DILBERT



By Seth Warner and Robert C. Osborn

That Helpless Feeling—Have you ever had your controls jam in the air? If not, take my word for it, there is nothing . . . positival nothing . . . that makes a pilot feel more helpless. The airplane takes charge and you can't do a thing about it.



It happened to Dilbert last week. Fortunately, he was at 6,000 feet at the time, going through his repertoire. When he tried to recover from a loop, he suddenly found that he couldn't get the stick back far enough to return to level flight.

He pulled, he tugged, he got hysterical and jerked, but it was no use. The damn thing was stuck, with the nose about 15 degrees below horizontal. Dilbert manfully fought the plane down to 1,500 feet, where he stopped swearing long enough to bail out, gasp thrice and pull.

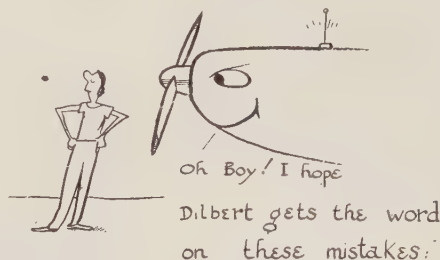
He started swearing again, and with reason, when he later learned what had caused all the trouble; merely a little cleaning rag. It was found tightly jammed in the flipper control-wire sheave. The harder he pulled, the tighter it had jammed.

Let's chase this thing into its hole and stuff it full of salt. To lose a plane this way just doesn't make sense. And rags aren't the only way to jam flight controls. You can do it just as easily with nuts, bolts, tools, or any other gear you carelessly leave lying around loose in an airplane. Believe me . . . it's much easier to sweep out a plane before flight than to sweep it up afterwards.



We have a Be-Kind-To-Your-Pa-And-Other-Dumb-Animals Week, and a Clean-Up-Your-Alley Week. Let's start a Be-Kind-To-Your-Airplane-And-Clean-It-Up Week—and let's celebrate it 52 times a year.

Pilot-Caused Engine Failures—Are you interested in preventing approximately one-tenth of all major-damage airplane accidents? It's easy.



In the first place, all these accidents occur because of certain engine troubles. In the second place, these troubles are all caused by pilot errors. In the third place, these errors are due entirely to carelessness or ignorance, hence, are avoidable. Here's how:—

a. Fuel System

Over half of the troubles will be found right here, all due to mishandling the fuel supply. Many forced landings occur when pilots attempt to shift tanks, or run a tank dry at such low altitude that there is insufficient time to regain suction. Except in an emergency, it is wise to have at least 3,000 feet altitude when shifting tanks. Even at altitude, it becomes a semi-emergency.

It is surprising how many pilots bitch up this simple operation, particularly if presented with it



"Switching tanks confuses Dilbert"

suddenly. Some shift to an empty tank, fail to shift at all, or shift back and forth from one tank to another without allowing sufficient time on any tank to regain suction. In the excitement, some pilots even shift to "off," do not center the selector valve properly, or fail to use the auxiliary fuel pump to give a positive fuel head. Some day we will have automatic selector valves. Until then, it behooves all pilots to hold an occasional mental emergency drill on this problem.

You'd be surprised how many forced landings are due to complete fuel (Continued on page 58)

Defenses Are Down

(Continued from page 18)

bomb any major city on this continent, and return to its home base.

The lack of information from behind the "iron curtain" plus the average American's belief that his country leads the world in industrial developments, have combined to lead to a dangerous apathy regarding other nations' ability to develop such aircraft.

It is true that the introduction of the long-range, heavily armed strategic bomber was an American innovation, but the impact of this development on the art of aerial warfare was too strong to be overlooked by any other militaristic nation. Not only did it affect theories of war, but the long-range bomber revolutionized global thinking in terms of distances. The direct route possible by aircraft junked all of the old maps and charts and introduced the now famous polar-concept charts (see illustration on page 19).

With the shorter distance possible by polar routes the heartland of this country becomes extremely vulnerable. The ice and bitter cold of the polar wastes may stop an advance by mechanized infantry, but would have no effect on a flight of a bomber formation.

The first question which must be answered is whether a polar defense is needed.

Well, let's look at the record.

Last summer American observers were shocked to see large Russian bombers resembling B-29's flying in formation over Moscow. This news resulted in an admission from Air Force officials that three B-29 Superfortresses had fallen into Russian hands in the early part of the air war against Japan.

These bombers had had to land at Russian bases in Asia when they were forced off course due to bad weather and had run short of fuel. The pilots reported the bombers had been flown to Russia by pilots of the Red Air Force after Soviet soldiers had confiscated the planes and their contents.

The Air Force further stated that the B-29's involved were of the original type and did not include the newer modifications. However, engineers are convinced that the B-29's seen over Moscow were not the same aircraft. They believe that the American B-29's were turned over to Soviet technicians who copied the models for Russian production and, possibly, improved them.

It should be remembered that it was a standard B-29, the "Pacusan Dreamboat," which flew from Hawaii to Cairo last year.

Another standard B-29 dropped the first atomic bomb on Japan.

In spite of the publicity given to the new jet bombers, the modified B-29 still remains the basic long-range bomber used by the U. S. Air Force. While larger bombers such as the ponderous B-36 and the bat-like B-35 have been developed, production on a small number of these has only just begun. Powerful jet bombers have been displayed, but many of these will never reach production.

While we have been able to view American developments, Red censorship excludes any comparison of our progress with that of the equally talented Russian engineers.

We do know that Soviet engineers have developed jet propulsions. We recall prewar four-engined Russian aircraft of comparable size to our prewar heavy bombers. We know that Soviet engineers have been reinforced by capable German technicians and scientists

who are now devoting their efforts to Russia.

We remember the visit of a Russian aircraft to this country before the war after it had flown non-stop over the polar wastes.

There is everything to indicate from the known facts, regardless of how little, that equal developments should be expected from the Russians.

When it has been indicated that a nation which has shown its hostility to the United States on every occasion is successfully engaged in the production and development of super bombers, then the polar wastes of Northern Canada become as vital to our defenses as are the beaches of New Jersey and California. In spite of this realization, we are totally undefended in the North.

A growing understanding of this problem has focused attention on Alaska. We have been assured that the Army and Air Force are building up Alaskan installations and that, in spite of tremendous difficulties, much progress is being made.

Yet, a view of a polar map shows that Alaska would be incapable of being a defensive site against any attack on the mainland of the United States. Alaska must be defended to deny any potential enemy the bases it holds. It is entirely possible that Alaska would be isolated in a future war and quickly neutralized as a potential base for retaliatory attacks by our forces.

The route to be taken by an attacking force probably would be over the desolate wastes of north-central Canada. The nearest Alaskan airbase would be several thousand miles away.

One of the first factors needed in planning a defense is a warning system. The success of the Royal Air Force during the Battle of Britain was largely attributable to an effective radar screen over the British Channel and northern Europe. Many well-meaning people suggest that we employ a similar radar screen in Alaska and Northern Canada.

Radar experts, however, state that the best military radar of today is nothing but a slight improvement over radar used by the British in 1940. They point out that our most powerful early warning radar had a range of only 200 miles—and that only under favorable conditions. To pick up an aircraft at maximum range, the altitude needed for the target must be over 30,000 feet.

Radar is still "line of sight," meaning that it cannot bend nor see over obstructions. An aircraft flying at low altitude cannot be seen by the radarscope until it comes within direct view. Too, radar is affected by electricity in the atmosphere and by heavy rain clouds.

In order to provide a radar screen with equipment at present available, over 300 installations would be needed in Alaska and Canada. In order to man and supply this radar network, an Army of men similar in size to the American Forces in Italy during the past war would be required.

This entire prodigious effort could be neutralized by a canny enemy who would simply send his bombers in at low altitude.

Along with an effective early warning system, a large force of interceptor fighters would have to be maintained, ready on a second's notice. To back up the radar network, at least 200 groups of fighters would have to be based in Alaska and Northern Canada. In order to be effective, a constant stand-by force would have to be on hand at all times in order to get the interceptors air-borne within a few minutes after warn-



"Watch this 9 G pull-out!"

. This would be difficult in balmy Florida. would be practically impossible in the ter Arctic cold.

The financial cost of maintaining the network and fighter support would be prohibitive peacetime. It is unlikely that this country's economy could sustain such a project very long. The Air Force is finding it difficult to convince Congress to appropriate sufficient funds to maintain 70 Air Groups all types of aircraft!

Another important point to consider is the sovereignty of Canada, and the certain objections of that nation to having a large American force within its territory. The failure of our diplomatic negotiations with Denmark for permanent Iceland bases and with the Republic of Panama, indicates the growing unwillingness of other nations to permit an existence of American military bases within their boundaries. Canada has a powerful and militant minority which is vehement in its objection to any further "encroachment" by the U. S.

Because of this, this country may be forced to plan defenses for its vital industrial centers from within the United States itself.

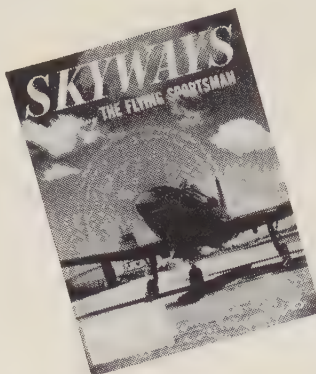
Lieutenant General Curtis E. LeMay, former director of Air Force research and development, stated that a radar capable of ranges up to 2,000 miles *must* be developed to insure a proper defense for this country. Dr. Vannevar Bush, chairman of the Research and Development Board, has been charged with the development of longer range radar, and a small number of scientists are now busily working on the project.

Even the most optimistic official, however, predicts that many years of research will be required before a suitable radar warning system can be developed. They hint that many of the features of low-frequency radio and Loran may have to be employed in order to solve the problem of detecting targets at low altitude or behind mountains and other obstructions.

In spite of all of the good intentions, it is unlikely that such a radar will be forthcoming in the near future. This may seem consistent in view of the record made by electronics engineers during World War II. However, nearly all of the talented scientists and engineers who worked on radar projects for the NDRC during the war have returned to civilian teaching or research. All of the "brains" which had been gathered together for the war effort now have been dissipated. Very few of these talented scientists are continuing on government or military research projects in their civilian institutions. The antagonism towards military control, built up during the war by hundreds of young scientists who worked under the National Roster of Scientific Personnel, has resulted in an open conflict between a large segment of science and the military establishment. Some military officials are frank in their disappointment with the results of research being conducted for the military by civilian universities and research agencies. Unless some manner is provided to enlist the type of talent available during the war, similar effort to provide a long-range radar will be impossible for a long time to come. In the interim, the Air Force contends that our only remaining defense lies in a strong retaliatory force which must be maintained on a high standard in order to discourage any potential enemy.

(Continued on page 53)

How to keep up with the Air Parade



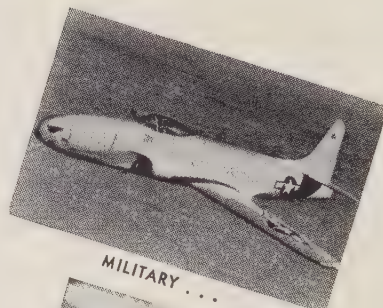
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Whether your interest runs to the latest doings of the speed kings, what the military is up to, or where to locate a good flyable plane for personal use—SKYWAYS is for you.

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Pilots as well as student pilots follow the flight techniques of men now opening up the new airways—commercial, military, and private—of American aviation.

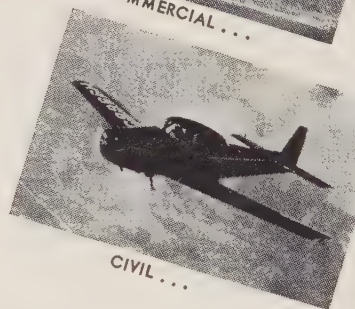
Soon to come are the plans of the Navy's Air Arm: stories of the developments and trends in Naval Aviation. The annual Personal Plane issue is scheduled for April. Don't miss any of the issues of SKYWAYS. Reserve your subscription now. Rates are still \$3.00 for 1 year, \$5.00 for 2 years, or \$7.00 for 3 years.



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Skyrocket

(Continued from page 21)

Segundo, California, plant, where the 'Rocket was built, wish to make a point of that. The ship was created for the Navy with its co-operation and that of the National Advisory Committee for Aeronautics, for the sole object of gaining knowledge for guidance in the construction of utility airplanes suitable for operation in or beyond the transonic barrier. There is not, certain journalists to the contrary notwithstanding, any "feverish race" with the Army to be first across the speed line of sound. Those who hurry too much to capture this dangerous bauble tend to lose, like young DeHavilland of England, who vanished without trace.

Actually, the *Skyrocket* stands a good chance of being the world's fastest airplane, if nothing goes wrong. But this will be because it is necessary to fly at that speed in order to calibrate the ship's instruments and learn her performance characteristics, as with any ship before it is turned over to the customer.

Thus, when the Navy took delivery on the *Skystreak* and flew her to an official world record, everybody concerned already knew she had it in her. Pilot May had found out by flying in that vicinity beforehand. But nothing was heard of it because he wasn't after records; he was after performance scores. To get those scores he climbed to the top of a 30,000-foot stairway and tried her out at the same given speed at each 5,000-foot step on the way down. Then he went back and did it over at $7\frac{1}{2}$ mph faster each time, until he had what he wanted. This is not the procedure of citizens anxious to win a race.

With the *Skyrocket* it will be the same thing . . . only more so, for this ship is going still farther into the unknown of speed and altitude, and as one goes, the answers to look for become progressively more numerous and complex.

Take, for example, the way the air is supposed to behave after a plane passes about three quarters of the speed of sound, as the 'Rocket is intended to do. Consistency of air-flow over the ship's surfaces disappears. It separates into a jumble of local and opposed velocities, each a fury by the side of which the worst hurricane ever recorded would be the caress of a geisha's fan. This is compressibility. It will be well to approach what is said to be a super-maelstrom cautiously. No man can tell, for certain, whether he has built his ship well enough to take it . . . or how much, or for how long.

1,000 mph . . . 200° Temp.

Heat is another problem. No one had given much thought to that until lately, though the meteors have been demonstrating for some years what friction can do. Thanks to that, it is one of our remaining blessings that these bodies, driving down from above the atmosphere, burn themselves out before they get through to us.

Too much heat begins a little beyond 600 mph. At 800 mph at sea level, irrespective of the heat put out by the sun and engine, an airplane's skin temperature would rise about 175°, and everything else would be hotter than the limits of safety specifications allow. The pilot would be knocked out long before that.

At 1,000 mph, the skin heat would be 200°

or just below the boiling point of water. Add to this the 100° of a standard hot day, and the strength of the materials the airplane is made of falls like a stock market in crash time, which is what it would be for the airplane. One kind of aluminum alloy drops to 87 per cent of par, another to 40 per cent, magnesium to 72 per cent, plastics to zero. The pilot roasts.

These are some of the things that inhibit the soap box derby spirit in building airplanes with the new look. It was these problems that held up conception of the *Skyrocket*, known to the Navy as the D-558-2, until VJ-Day, one year after the *Skystreak* went on the drawing boards. Until then the combined knowledge of aeronautical scientists didn't yet contain the vital key to an airplane capable of sonic speed, or which would hold together under the terrific heat and buffeting expected to be encountered there.



TEST PILOT John Martin, a 40-year-old flying veteran with 8,300 hours to his credit, is the man to whom Douglas Skyrocket is being entrusted for its flight tests

Then two things happened to permit this next step after the *Skystreak*: the discovery, among smaller things, that swept-back wings and tail increased aerodynamic efficiency and speed; and that rocket power could be teamed with jet, to take advantage of the speed gains in design.

A construction departure found to be feasible, also in the interest of faster passage, was to fix the skin in place first, against exceptionally rigid jigs, and then build inward from there. This kept surface irregularity down to that of a dollar-a-dozen egg. The 'Rocket's body skin is magnesium, one tenth of an inch thick; the wings and tail mostly aluminum.

While the wing is subsonic in type, to allow it to take off and land at reasonable speeds, it is exceptionally thin, to permit operation in the critical range between the subsonic and the supersonic realm. There, as far as anyone knows, smooth riding resumes. The thinner the wing the less trouble with compressibility in getting through to this range. How thin the *Skyrocket's* wings are cannot be told, but it is generally known that wing thickness on our fastest planes ranges between 8 and 10 per cent, compared

to 18 per cent a few years ago; and a reduction to 4 to 6 per cent is under study.

The effects of frictional heat on the airplane itself will be offset by flying at a new altitude easily permitted by the innovations in design and power. Ten miles up will be no trouble for the 'Rocket. Standard temperature at 35,000 feet is 65° below zero, and it remains constant from this level on up to 100,000 feet. In these altitudes, at 1,000 mph, only 10 per cent of metal structural strength is lost to frictional heat. Plastics lose somewhat more.

On the other hand, an airplane's strength is taxed sooner up here, for the same cold temperature that protects it also causes compressibility to arrive about 100 mph earlier than down at sea level. So go the laws of compensation. It may be news to some, as it was to me, that temperature is the sole factor governing the onset of compressibility; air density has nothing to do with it.

While the chilling influence of high-altitude cold keeps the plane cool enough, it isn't enough to take care of the pilot. Being as sealed in as a tomato in a fruit jar, to allow near sea-level pressurization of his cabin, he would broil from the more than 500-degree heat of the engine, were it not for artificial refrigeration.

To give you an idea of how hot it gets without such cooling, the cabin temperature of the *Skystreak* during its 650-mph sea-level dash would have been 180°, about one third above human endurance. As it was, it rose well above a hundred, indicating that with present attainments in cooling devices, 700 mph is the outside limit near the ground.

Working out a satisfactory cooling system for these new hurry buggies has been the toughest problem ever tackled by the science of refrigeration. Until it was solved, there was no use building airplanes like the 'Streak and the 'Rocket, just as the works were held up by the search for an alloy able to withstand the white heat of the turbines. In this business, every acorn problem of conventional aviation becomes a tremendous oak.

To keep the cabin of the *Skyrocket* cool during its top rushes called for something that would do the work of 40 household refrigerators. Ice, if it conceivably could be carried in the tonnage necessary, would melt at the rate of $5\frac{1}{2}$ pounds a minute, faster than in your kitchen oven.

A considerable improvement over ice was supplied in due course by the AiResearch Manufacturing Company of Los Angeles, in an innocent looking little device weighing only 16½ pounds. This performed the remarkable feat of taking air from the engine compressor at about 450° and reducing it to around 60° before feeding it into the cockpit. The central secret of this trick lies in an aluminum disk the size of a silver dollar spinning 100,000 revolutions a minute.

The riddle of small, thin-walled tires for the nose and main landing wheels—light weight yet rugged enough to stand up under 180 pounds of pressure, about six times that of your automobile tires, during the unprecedented but unmentionable speed of taking off and landing—was solved beforehand by the tires evolved for the *Skystreak*. Landing-edge type automatic slots that offset the lift loss in back-swept wings, keep ground speeds from being still hotter.

The wheels tuck into the fuselage rather
(Continued on page 51)

Design for Security

(Continued from page 35)

- A 70-Group Air Force-in-Being;
- A strong reserve organization;
- An air industrial preparedness plan; and
- An effective program of research and development.

The first point, autonomy (co-equal status with the Army and Navy under the Unified Department of National Defense) achieved late in 1947, although the full transfer of functions is still taking place. When all the problems have been worked out, both economy and the highest possible degree of coordinated action should result from this unification. The public expects all three arms of the services to put the old school ties away in mothballs and to cooperate, from rookies to top brass, with the single-minded capacity of Americans with the well-being of their country at heart. There is room for honest differences of opinion, but those differences must be reconciled, and speeded in the common interest.

The 70 Group Air Force-in-Being represents the total air organization, "all the units of which are formed, equipped, trained and ready to go into action on a moment's notice and to function efficiently and effectively thereafter."

The emphasis of that statement belongs on "action on a moment's notice." No one doubts any longer that the United States can expect to bear the brunt of the first attack, delivered with all the strength of which a potential enemy is capable. Unless we can answer such an attack with split-second response, we shall be too badly mauled industrially and in our military installations to make more than a feeble retaliation. The heart-breaking months which followed Pearl Harbor will seem like a distant memory by comparison.

Those 70 combat groups, plus 22 specialized squadrons, are organized to defend the Zone of the Interior (the United States proper); our Pacific and Atlantic outposts and to engage the enemy in whatever section of the globe he inhabits. This can be, in the words of the Psalmist, "unto the uttermost ends of the earth" and under such conditions, it is a stern task which our men face.

A total of 401,000 military personnel and 150,000 civilians man the 70 Groups, with 50 per cent of the military technically trained as pilots, bombardiers, flight engineers, radio operators, radar operators, air gunners and aircraft mechanics. The maintenance of the force will require equally stringent training in intelligence, administration, procurement, supply and personnel management. At least 14,969 aircraft will be needed, of which 9 will be first-line and 8,100 modern planes in reserve. Worn and obsolete craft must be replaced at an annual rate of 4, enough to give a 100 per cent turnover every six years. That means a procurement of 3,200 planes each year. These figures represent only the *minimum requirements* of peacetime strength, and numbers alone do not tell the story. The 3,200 plane procurement program should be translated into 46,000,000 pounds of airframes annually. Out of that backlog of orders will grow a healthy and revived aircraft industry—also in-Being.

Under this Organization Plan are three major combat commands and five others in support. They are:

—The Strategic Air Command—long-range striking force ready for instant action against enemy economic and military strength;

—The Air Defense Command—whose responsibility is defense of the United States, and which coordinates the immediate mobilization of the Air National Guard and the Air Reserve;

—The Tactical Air Command—trained for joint action with sea and ground forces, but with fighter strength available for independent operation at any point where it is needed;

—The Air Materiel Command—responsible for air research and development of the best possible weapons and equipment;

—The Air Training Command—responsible for all training except higher education and unit instruction;

—The Air Transport Command—to provide transportation for men and materiel; to maintain airways communications, weather data, air search and rescue and aero charts;

—The Air University—responsible for higher education in the latest Air Force doctrines and supervision of selected personnel in civilian universities and (Continued on page 49)

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No Solo, Please

(Continued from page 30)

work the controls. How many times in your family does the wife do the driving on a Sunday afternoon? That is one of the basic reasons, I think, why it is harder to teach most women to fly; they must be sold on the idea that it is fun, convenient or nice to know how before they have any particular incentive to learn.

I finally convinced myself that I had a good reason to learn to fly and started out all over again. No, my husband wasn't the instructor. We'd tried that, but I know him too well. He has to live with me, and he won't make me fly the way a stranger would. After all, I can't get by with "I don't want to do spins today. Let's do something else," when I'm up with an instructor that I don't know. Wes Uglov, another ex-Burma Hump driver from the East Los Angeles Airport, finally wound up with the job of teaching me.

I drove down to the field five days a week, the same time each day. We had the same plane every flight. I finally learned to fly well enough to suit the instructor. I wasn't at all like the average student, much to my instructor's confusion. I didn't want to solo in a hurry; I wanted to sell myself on the idea that I was actually flying the airplane and not having it fly me. I learned for the first time in seven years of off-and-on flying that a coordinated turn isn't just an accident. I was far more particular than the average beginner student . . . probably because I'm older, have flown more and know how the different maneuvers should be done, even though I don't always do them that way.

Elmer Riley, who was formerly director of flying at the WASP field in Sweetwater, Texas, where 1,000 women pilots were trained during the war, now operates a flying school nearby. I asked him if he thought it took longer to train women pilots than men.

"The lack of mechanical background is the girl's main difficulty," was his reply. "The girls are superior in their detail work on cross-country and instrument flying. As a general rule, they have smoother coordination than the average man, but the working knowledge of general mechanics, so common in young men who have built their own automobiles, maintained rickety motorcycles and worked around engines since they were old enough to walk, is what gives the men a slight advantage.

"The girls take more pampering and more encouraging, but when they get through, they have a more thorough background than the average pilot just because they started flying without a lot of ideas that must be changed to fit the mechanics of flying. They start from scratch and ask questions on subjects that the average pilot is too prone to take for granted."

Maybe I was pampered in my flight training, but I'm not so sure. While shooting landings one hazy day recently, I felt the controls partially freeze. I pushed harder and harder on the stick to keep the nose down. I checked the trim tab and the controls. Everything was OK except that the stick worked too stiffly. As I turned on the base leg prior to landing, the instructor quietly slid the stick from the back pit up over my shoulder. I jumped, looked around into his grinning face, and he chuckled.

"See, I've paid up my life insurance.

Now you've got to land it all by yourself." The landing wasn't too bad.

It wasn't all horsing around. Unconsciously it built up my confidence, and his antics helped me relax in flight. After I'd made several high approaches for landings, the instructor said: "I think you're afraid of the ground. Here, let me have it for a minute." He took the controls and gave me one of those air show "drunk-act" landings—first on one wheel, then on the other with the wingtip dusting the runway. We skated out toward the brush adjoining the runway and finally rolled to a stop almost crosswise to the landing strip.

"See," he grinned. "The plane will take all that. By comparison, aren't your landings a lot smoother?"

When we finally taxied up to the line, a mechanic eating his lunch under the wing of a parked plane looked up and asked me, "Have a little trouble with that last landing?"

Finally my instructor started taking his lunch along; "I'm just going along for the ride anyhow," he would banter. That, too, was good for me, because I felt that I was doing all the flying myself.

At last I told the instructor that if I could do a good job of landings for three days in a row, maybe I'd let him get out. We had to change types of planes about then, and each successive landing was worse than the one before it. But I finally shot six good ones in a row and let the instructor get out. He'd finished his lunch anyhow.

Solo students all say that they can hear their instructor talking to them all the way around the pattern. Ha! For several days prior to my solo hop, he'd let me do all the flying, and when suggestions were necessary, he'd give them after landings. I'd gotten into the habit of checking myself all the way around and not relying too much on him, so the actual solo wasn't such a shock. I shot four passable landings in a row; at least I didn't bend up the airplane. For the first time I felt a little confidence in my ability to fly the plane, not have it fly me.

In overdue time, I finally took another flight check and got my private ticket. Then two weeks later, I began to worry again. The local Cessna Distributor called up my husband and asked him to ferry a new "120" out from their factory in Wichita, Kansas.

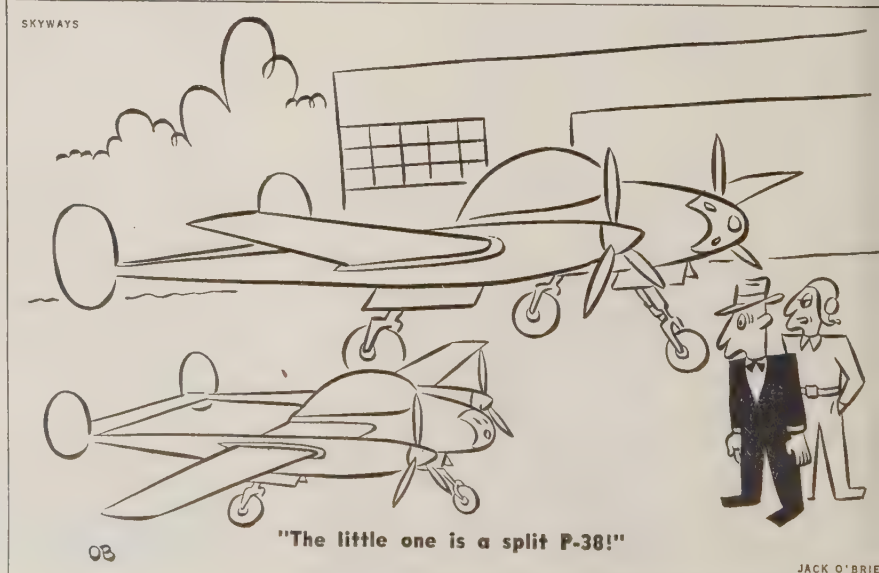
"By the way," said the dealer, "there are two planes to pick up. Now that your wife has her license, why not make it a little vacation and have her ferry the other one?"

You can easily guess what happened. In spite of my objections, I went to fly out the second plane. We had nothing but headaches with the weather all way. Our first landing at Amarillo, Texas, was in a 40-mph gusty surface wind—and I'd never done wheel landings in a Cessna.

We hit unseasonable headwinds over Tucumcari, N. M., and spent one night there. We landed at Otto Radio, an emergency field just east of Albuquerque, because I had too many cups of coffee with my breakfast. The field, we found after landing, was closed to light aircraft because of the mass of gopher holes on the runways, but the one piece spring-steel landing gear on the Cessna kept me out of trouble. We spent the night in Gallup, N. M., where it hadn't rained for months, and then took nearly an hour the next morning to pull my plane out of the adobe mud in the parking area after night-long torrents. We picked up two passengers in Gallup and flew them to the Grand Canyon; mine had never before been up in a lightplane, but I didn't have the heart to tell him that he was my first passenger.

And to wind up the trip, we flew through a desert cloudburst near Needles, California, that washed out railroads and highways. It was so dark and wet sneaking around the edge of that cloudburst that my husband had to turn on his navigation lights so that I could keep his plane in sight. Believe me, I flew close formation on that leg of the trip.

So now I've got 14 hours and 40 minutes more solo X-C time in my log book. I know a lot more about flying than I did when I began again, but the longer I fly, the more I'm convinced that it just takes longer to make a good, at-ease-in-the-air pilot out of a woman than it does a man. And after all, what's wrong with taking a little longer to learn, as long as you do a good job when you're through? This generalization won't hold true for all women pilots, I know, for many have as much mechanical background as men and learn with corresponding speed. But for the average not-too-adventuresome gal, why not enjoy it and take a few hours more training? It's all fun anyway.



JACK O'BRIEN

Design for Security

(Continued from page 47)

the Air Institute of Technology; and

8—The Air Proving Ground Command—which carries on constant testing of aircraft, equipment, doctrines, techniques and methods of training.

A further breakdown was recently given by W. Stuart Symington, Secretary of the Department of the Air Force, in his testimony before the President's Air Policy Commission. Mr. Symington disclosed the fact that there will be 21 Very Heavy Bomb Groups (30 bombers each); six VHB Replacement Groups (B 29's, or the newer, heavier planes now being built); five light bomb Groups; 22 fighter Groups; three all-weather fighter Groups; four tactical reconnaissance Groups and 22 "special squadrons." He said that the Air Force can now supply its present 55 Groups out of its reserve (most of which is war surplus) but would have only 2,805 planes of suitable type above that number instead of its desired reserve of 8,100.

Two very important points should be made here,

1—that we are spending more than \$10,000,000,000 on our armed services in the current fiscal year, and 2—that we will obviously have to spend a very great deal more to implement the proposed program. As this article is being written, the first word of the recommendations being made by the President's Air Policy Commission has broken. With considerable courage, the Commission has gone on record for an immediate shift in emphasis to the Air Force as our primary defensive arm—conceived as a striking force; that its long-range bomber program should be developed *at once*, and that we should nearly double our military expenditure by 1952, with the entire program reviewed at the end of 1949. We are warned again that there is little probability of a long-range, atomic attack *before* 1953. But by that time we must be ready! Three years in which we can work for continuance of peace, because we have built ourselves so strong—or three years of hiding our heads in the sand, and then—just radio-active dust blowing across a desert that was once America.

There must be a tremendous concentration of the public will as well as an outpouring from the public purse in that terribly brief period. Our wasted aircraft factories have begun some deliveries of heavy bombers and transports this past year, but remembering the more than 90,000 planes we produced in 1944, the total of approximately 1,800 units of all types in 1947 seems fantastically small. Especially since only 280 of them were two- and four-engine aircraft. The net financial loss of the 15 major factories represented is more than double that of 1946—approximately \$23,000,000.

We need men for the program as well as equipment—the best men as well as the best weapons. Recruiting also has been lamentably slow. Under present law, the AF has an authorized strength of 401,000 officers and men. It is still around 85,000 short of that number (20,000 officers and 65,000 enlisted men), and woefully short of the vitally necessary skilled mechanics it wants. Eighty per cent of its active personnel must have more technical training. In spite of the really remarkable job which is being done at the three basic training centers for enlisted personnel (Keesler, Chanute and Lowry Fields), and the exceptional inducements being offered to recruits, they are coming in very slowly. Yet the Government is spending approximately \$1,500 on the technical education of each of these men and they now have the opportunity, under the Aviation Career Plan, to choose up to three specialties and to advance to a specialist's rating giving them the equivalent of a Major's pay—or to qualify for Officers Candidate School. But fewer than 3,000 applicants have been approved so far.

The elite corps of the Air Force—the Air Cadets—is also undermanned. Requirements are stiff: applicants must be unmarried, between 20 and 26½ years old, with the equivalent of two years of college and of such high physical and mental caliber that only the very finest of our youth can qualify. A \$25,000 education, with pay, is the Government's offer to those who do.

The Reserve program has been critically hampered by budget limitations and, again, by public indifference. The Air National Guard, with a present strength of 12,984, is short of its personnel goal by nearly 15,000. It has only 1,948 pilots and operates only 1,900 aircraft from 63 airfields. Lack of funds has closed out 29 of the 70 Air Reserve detachments which had been activated and the 41 remaining have 153,000 men receiving training instead of the desired 170,000. At the moment, (Continued on page 52)



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A Strong Air Force

(Continued from page 33)

2,411,294 with 36,223 trained combat crews.

After VJ Day, however, the clamor for rapid demobilization was so great that between May 1, 1945, and December 31, 1946, we had returned to civilian life 2,122,535 persons and the Air Force was reduced to 332,135. Even that was not a true picture, since the highly trained personnel were the first to be released because they had the greatest number of "points." Between January, 1945, and October, 1946, there was a drop of 90 per cent in airplane mechanics, of 95 per cent in instrument specialists, and of 96 per cent of other maintenance personnel. At the end of demobilization, there was not a single squadron which could even approximate wartime standards of efficiency.

Today, we are still struggling to reach a fully manned and armed force of 55 air groups with our sights set on a peace strength of 70 groups. We are assured by the Air Force that this is the least strength to which we dare limit ourselves in the interests of security. For those 70 groups, it is estimated that a minimum of 6,869 first-line airplanes of all types will be needed, with 5,572 for the National Air Guard and the Air Force Reserve. In storage, will be 8,100 more. The Navy is asking for its air arm a regular operating strength of 8,000, with 2,700 for its Reserves and 3,800 replacements in storage. Annual replacements for the two striking arms would be about 6,000 aircraft per year, as compared to between 1,700 and 1,800 per year being manufactured now.

The sudden postwar shrinkage of war orders such as experienced by the aircraft manufacturers would have been a death blow to any industry. But, with the sort of backlog discussed above, and with orders staggered over a period of years, our nearly bankrupt aircraft industry could rapidly revive and provide us with the basic production lines for speedy industrial mobilization in case of an emergency.

There are still many other factors to be taken into account. Our reserve air units must be maintained in excellent condition. As was proved in World War II, our air carrier system must be thoroughly equipped and manned. It must be maintained in a healthy financial condition and with national and international all-weather navigational and communications systems-in-being to allow them to operate under any and all conditions for the transport companies are little better off, financially, than our aircraft manufacturers, and we have only *begun* the job of developing an all-weather system of communications and navigational aids for continuous safe flying. Our private flying industry has suffered as well, with the rising cost of living cutting deeply into the budgets of people who would normally buy light-planes and flying time. Many of our small fields have been kept alive only through the flight training given under the GI Bill of Rights—but that is nearing its end and the Veterans Administration has done everything possible to discourage veterans from taking flight training since there are so few job opportunities in the current aviation industry, even though the number may increase materially in the next year or two.

It is a sad commentary on our national good sense that we have allowed our most



valuable security asset to drain away while the world was still in a state of dangerous unrest. It is comparable to the man who allows his life insurance policies to lapse at the very time when he must undergo a serious operation.

These really simple facts have been lost sight of by both our government and our citizens for two major reasons. The first was the inevitable let-down which always comes after the tremendous effort of fighting and winning a war. The second has been the unfortunate over selling of the idea of push-button warfare and its fantastic, electronically operated missiles. Los Alamos and Bikini were vitally necessary forward steps toward a yet distant future, but the mushroom-shaped cloud of the atomic bomb has obscured our vision of the immediate necessities. We can stockpile atom bombs to the point of national economic exhaustion and be no more secure than if we were stockpiling marbles unless we have an Air Force-in-being, with long-range planes capable of delivering those bombs to any indicated war target, long-range jet fighters able to provide cover for the bombers, and bases strategically located and equipped to launch and supply them. Behind them all must be an aircraft industry whose wheels are already in motion and capable of turning up the immense speed of production which we possessed at the end of World War II. Our air-defense system, with a radar network located and operating as far from the United States as is diplomatically possible so that we may be warned of attack while it is on the way is the same system which will allow our peaceful commercial air fleets to fly safely and dependably at all seasons of the year. The planes of that commerce, both passenger transport and cargo aircraft, will be the nucleus of our logistical operations in time of emergency..

We must not cease for a moment our efforts to keep well out in front in the race to develop the weapons of the future—that is a truism which none of us will deny. But, equally, we must have a strong Air Force-in-being now, with the best weapons we can design and produce and the best trained men we can muster.

As men of good will, we must do everything within our power to achieve a truly peaceful world through strengthening the United Nations and through the desperate gamble of getting Europe back on its feet. We must not forget, in the midst of our absorption with these desirable and humanitarian projects, the adage of our forefathers to walk warily and to keep our powder dry. We stand today, with our wealth and our priceless liberty, almost naked of defense in a menacing and disturbed community of nations. We *can* keep the peace if we are firm of will and strong enough to thwart an attack. Otherwise, we are the prime, the tempting target for any aggressor.

We must not permit ourselves to forget the Neutrality Act of 1935 when the United States in effect, declared itself not interested in the military armament race which was being instituted by the Germans. Because of this Act, Hitler knew he was free to proceed without interference from the United States. It is not unlikely that had the United States been properly armed, and had we declared ourselves ready for action, there might have been no World War II.

Are we going to repeat that folly? Any future aggressor is intelligent enough to realize that no similar attempt at world conquest could be attempted unless by internal sabotage or by a successful direct attack without warning. This, we dare not risk. Adequate preparations for defense will be our best insurance of security.



One-Man Airport

(Continued from page 24)

d 9 in the morning, and 4 and 8 in the evening. During midday the air is so rough at it is impossible to teach, and a green lot is lucky to stay right side up. Dust devils and thermals make landings very rocky and a lightplane could be wrecked—easily and quickly—in the shifty winds. In the winter, conditions are much more ideal. The man I bought the field from had hoped to put in a CPT program before the war. That was his main reason for enlarging the hangar and lengthening the runways, but he was just 30 miles inside the 150-mile coastal defense zone and was not permitted to fly. Now, with a half-mile runway and no smaller crosswind strips. I hope to get a G.I. program started. There are nearly 100 eligible veterans in the valley, and nearly all have talked with would come out to fly at government expense. I can keep the family waiting for the next four years if I can get approval—but the paper work has me nearly snowed under.

The best flying salesman I have is Jack, the 240-pound Sheriff who must be well over 40 years old. He is literally the biggest poster I've got. I taught him to fly, and he finally bought a new *Cub* from me. Now he has a pint-sized landing strip in back of his own house.

I write a little column once a week for the local paper, with names, notes and news about the field. Of course, I have to buy and sell to keep the editors happy, but I guess it pays off. Actually, you might be surprised to know that many people never get the idea of flying until something in an aviation column attracts their attention and gets them interested in learning to fly. I've heard many an airport and flying school operator remark that an aero column run by him or by someone at the field has drawn in as many new students as his advertisements. Many times is the column that gets them interested, the field that really sells them. I also helped get a desert flying club started, and the students who buy block time or sign up for a full course, get a discount on flying time.

If I had more time and capital, I'd put up some small guest houses for weekend visitors. The field is just a nice hour's flight from Los Angeles and I'm sure I could have a house of paying guests if I had any special accommodations to offer them. Then, too, I need a four-place plane for charter and ambulance work. There have been far too many customers turned away when they wanted to take a trip with a large group. And I need a tractor or a jeep. This smoothing runways with a drag hooked behind the family sedan is no good! I could sponsor breakfast flights, weekend hunting and fishing trips from the field, and a glider contest now and then. With one man—me—running the field, I just can't go out after that extra business.

Why not quit? I might if I didn't think there was a future here, and a good one, for a guy and his family who like to fly, like to work for themselves, and really enjoy life in the wide open spaces. Naturally, it'll take time to build up this little field, but more people keep moving to the desert all the time, probably for the same reason I'm here. I'm sure that there's a future in it for me—and here I'll stay.



Skyrocket

(Continued from page 46)

than the wings, as in the *'Streak*. There wasn't enough room in the wings. This may be the tip-off on how thin the wings are, although their back-sweep was also a factor in this arrangement. The 250 gallons of aviation gasoline for the jet engine, and one and a half tons of rocket fuel are contained in the fuselage for the same reasons. This makes the *'Rocket's* belly notably fatter than that of the *Streak*, which used kerosene carried in the wings.

The shock-absorber cylinder and its supporting fittings, incidentally, was cut from a single 350-pound block of steel, a weight-saving procedure that kept the weight of this unit to a mere 60 pounds. As on the *Sky-streak*, the pilot's compartment may be detached via pilot ejector unit, affording protection in case of trouble until it has slowed down to a safe speed for bailing out.

'Rocket Wiring

Since the *Skyrocket* is essentially a highly sensitized measuring instrument, one of its more intriguing features is the volume and complexity of the mechanism which gives her this character . . . literally like the nervous system of the human being.

More than four miles of wiring and three miles of tubing form a ganglia that carry messages concerning pressures and vibration from 400 points on the wing and tail, to the brain, or recording equipment, just back of the cabin. Here the messages are written on 904 gauges, and automatically photographed on motion picture film. Air pressures are gotten through tiny holes down the center of standard countersunk Rivnuts inserted from the outside of the skin and secured to aluminum tubes inside . . . like human skin pores. The weight of this neuronc organ, the payload, is 500 pounds.

When pilot Martin first takes off in this Santa Maria of the transonic unknown, he

will spare his second horse, the rockets, until he is somewhere above 25,000 feet. How far above is a secret. There, leveled off and riding straight ahead in the cold blue as hard as his most powerful of jet engines will push him, at least 600 mph . . . there, at the beginning of the transonic range, he will reach for the lever that hitches in his reserve horse, itself and powerful as the first.

This will be a crucial moment, and a lonely one, for now he will leave behind, without witnesses to see him go, the world of speed as all other men for all time back have known it.

Probably he won't cut his rocket horse full force at once, but will do so gradually, one tube at a time. Then, if all seems to be going well, if the ship isn't being tormented too much by the fiercely roiling air eddies of compressibility, he will cut in a second tube, and so on, as one successively turns on the burners of a gas range, until he has them all going. Each tube, contrary to popular belief, is not fired like a gun, but sustains its thrust for as long as there is fuel. For some moments, then, Test Pilot Johnnie Martin will be flying independently of his wings, supported—like a bullet—by centrifugal force alone.

In three or four minutes, two minutes if he fires all his rocket tubes together, his ton and a half of rocket fuel will be gone, and he will draw back from the world in which, for a little time, he became one of the first and perhaps only visitor. His stay there will have been exclusive not only in the corporal sense but in that no airborne call from behind could have caught up to intrude upon him. Nor could he have been stopped by a bullet, for that, too, would have been too slow.

Some 30 minutes after he leaves the ground the voyage will be over. In that brief space, man may well have bridged the gap that yawns between the age of airborne flight and the rocket era of tomorrow.

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For Security

(Continued from page 49)

the Air Reserve has 2,360 combat type, second-line planes available.

The last group—the Air ROTC—has about 23,500 students in training at 96 colleges and universities.

Logistics could be reasonably well handled by the Air Transport Command, working with the approximately 1,000 commercial air carrier planes and their crews, but we still do not have enough big heavy-duty cargo and transport planes and, even more vital, the air-weather navigational and traffic control electronic equipment to keep them flying under zero-zero conditions. That same electronic all-weather equipment is urgently needed for another reason—it can double in brass as our radar warning net, letting us know if enemy planes are coming in for attack.

The sad situation of the aircraft industry has already been mentioned, but there are some rays of hope. Under the industrial mobilization plan, contracts have already been awarded to manufacturers for the preparation of their mobilization resources requirements, and stockpiling has begun. Private manufacturers have been allowed to lease nine big government plants, with the stipulation that they must be returned immediately in case of national emergency. Too, 40,000 selected machine tools are being stored in strategic locations.

Over and beyond everything else, however, is our Research and Development program, now being coordinated by the Department of Defense. To our peril, we neglected this field of protection before World War II—and nearly lost the war because of it. Only one-fifth of the funds that should be allocated to it are now available, but the lack of trained personnel in higher science is the greatest lack of all. It takes several years to prepare such scientists and, with characteristic jejunity, we drafted all too many of our potential scientific specialists

under the pressure of wartime psychology.

The Air Force, in spite of all these handicaps, has been able to approve acceptance of two jet fighters—the P-80 and the P-84, and two jet bombers, the B-43 and the B-46. Early designs of surface-to-surface, surface-to-air and air-to-surface guided missiles are being slowly and painfully tested in pitifully small numbers. The School of Aviation Medicine at Randolph Field is studying the resistance of the human mind and body to supersonic speeds and stratospheric altitudes and pressures, and the ways to strengthen their resistance to these abnormal demands. Their work is of such elemental importance that its results will affect all medical knowledge. The actual mass conquest of the sonic barrier is merely a matter of time now, and man—the pilot—must be ready.

Remote control of aircraft is far advanced—as witness the recent trans-Atlantic flight of a C-54, entirely dominated by electronic devices. In the Climatic Hangar at Eglin Field, Florida, the study of the effect of polar temperatures on men, machines and equipment is proceeding under simulated conditions duplicating the actual ones under which we should have to operate if an attack comes by way of the Arctic. What is being done with our most deadly weapon is the deepest secret of all, under the control of the Atomic Energy Commission. All these experimental missions need more and better equipment.

One of the finest parts of the Five Point Program is the work being done at the Air University at Maxwell Field to prepare the minds of the men who will direct any future war in the startling new concepts which have grown out of the combined Air and Atomic Age. Our entire pattern of thought had to undergo a complete readjustment to meet the potentials and the impacts of the facts which science has discovered or developed. And we are still children in understanding.

Three years is a very little moment of time in which so much must be done. So roll up your sleeves, America, we'd best be at it . . . and quickly!



Sonic Speed

(Continued from page 36)

by the intelligent utilization of our scientific talent can the United States remain abreast of the nations in the field of aeronautics.

The United States Air Force has not been idle in developing new types of aircraft. During 1947, 17 new types of planes were delivered to the Air Force. All of these planes represent refinements and improvements over those used in World War II. In general the trend in aircraft has been toward developing fighters and bombers employing jet propulsion.

Two jet-propelled fighter planes are now in quantity production. The Lockheed P-80 *Shooting Star*, which regained the world's speed record for the United States last year, is the only postwar plane which the Air Force possesses in considerable numbers. At the close of the year, the Air Force had 550 P-80's. A sufficient number of Republic P-84 *Thunderjets* have been delivered to permit familiarization training. Six hundred of these planes are on order.

The North American XP-86 is nearing the production stage and 225 have been ordered. This plane is a single-place low-wing fighter with swept-back wings and tail assembly. It is designed to attain speeds in excess of 600 mph with a range of over 1,000 miles and a service ceiling of more than 40,000 feet. The XP-86 is powered by a single GE jet engine and employs a single ram duct with an opening in the nose.

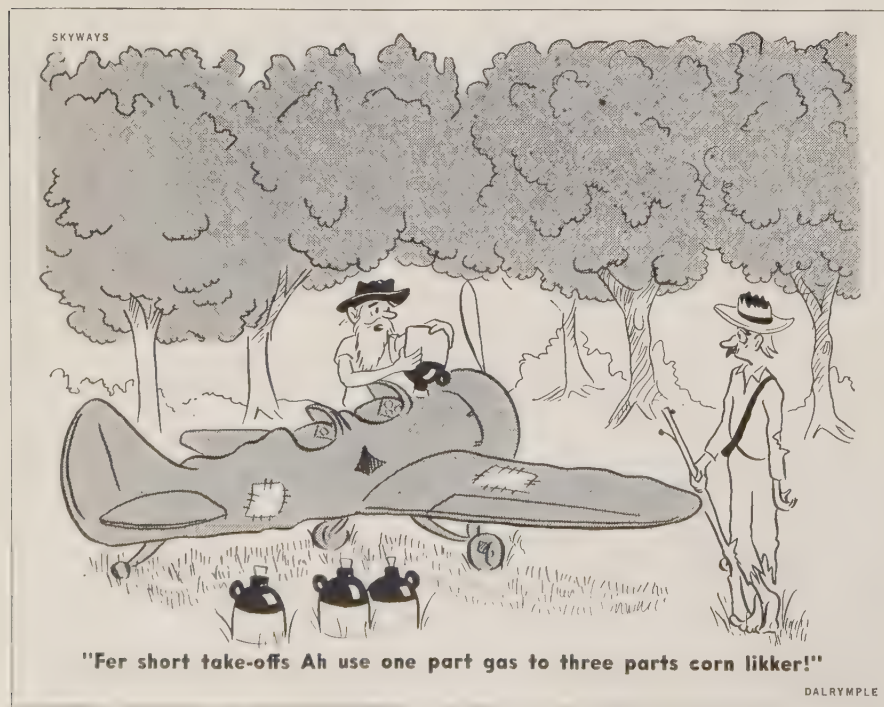
The other jet fighter received by the Air Force during 1947 was the Curtiss-Wright XP-87 which will make its first flight this year. The XP-87 is a four-jet plane powered by Westinghouse engines. It is manned by a crew of two and designed to operate under extreme weather conditions. Two experimental models have been ordered.

Employing the conventional reciprocating engines, the North American P-82 *Twin Mustang* was received by the Air Force early in 1947. This plane, powered by two 12-cylinder Rolls-Royce engines flew 5,000 miles non-stop from Hawaii to New York last February. The P-82 has a top speed in excess of 475 mph and a combat radius of approximately 2,500 miles. The radical design is attained by joining two P-51 *Mustang* fuselages to a single wing and horizontal stabilizer. It carries a pilot in each cockpit, with an automatic pilot in the main cockpit to reduce the problem of pilot fatigue on long flights. The Air Force has ordered 250 of these planes.

In the bomber field, three planes are in production, the B-50, B-36 and B-45. The B-50 is the successor to the wartime B-29 and with the B-36 is the nucleus of our strategic bombing force. The B-50 resembles the B-29 but actually 75 percent of its design is new and represents the results of wartime experiences and experimentation. The B-50 is powered by four 2,500 horsepower Pratt & Whitney *Wasp Major* engines and is capable of speeds approaching 400 mph and a maximum range greater than that of the B-29. Contracts have been made for 215 of these planes and delivery is expected by Spring.

The second bomber to reach production stages is the world's largest land-based bomber—the Consolidated-Vultee B-36. The B-36

(Continued on page 54)



Defenses Are Down

(Continued from page 45)

At the same time these same officers darkly predict that the next war may be decided in the first few hours.

If this is true, then this country is taking a tremendous gamble in that we may be defeated before we get the opportunity for a strong retaliatory attack. In one raid an atom bomb-laden force of enemy bombers could completely crush our power to resist.

It must be pointed out that the present known state of development of heavy bombers, excluding experimental models, by all nations including our own, precludes any chance that a large force would be able to penetrate over the polar area and return to home bases.

In the Quarterly Review of the Air University, the thought was given that one-way bomber flights must be considered. Continuing the theory that a major nation could be crushed by one overwhelming atomic attack, the writer suggested that all air crews be given special survival training in order to utilize present aircraft in case of an emergency.

He pointed out that aircraft are largely expendable, but the value of a large atomic raid might quickly bring a major nation to her knees. He suggested that B-29's be used on one-way flights, with the crews bailing out and surviving under commando methods until an occupying force arrives.

While suicide missions, or anything resembling them, are inimical to our military policy, we must remember that such ideas are not horrifying to Eurasian thinking. The Russians boasted of their pilots who purposely rammed Nazi aircraft during the last war.

It is entirely probable that a nation which values life as cheaply would employ such methods in its initial attack, especially if the goal was world conquest through the immediate destruction of its most powerful hindrance.

It is the military thinking that no nation will attempt war with this country as long as we remain stronger than any potential enemy. It would be more correct to state that no nation will attempt war as long as it *thinks* we are stronger.

If this is the case, then the first hostile nation to develop the atomic bomb along with suitable aircraft to deliver the bomb, will have no longer any reason to hesitate against war with the United States.

Strange as it may seem, then, our best and only defense against surprise attack from over the North Pole lies in American scientific laboratories rather than in a string of military installations in the far north. The success of our science research would answer most of the problems.

For one, it may provide us with devices which could replace antiquated radar facilities with long-range equipment capable of recording air activity over central Europe from bases within the U. S.! I have been assured by radar and electronics experts that this is entirely feasible requiring only time and effort on our part.

Secondly, a successful research program would insure this country's leadership in the development of new weapons, etc. With this leadership clearly established, no nation

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would dare run the risk of hostilities.

Before this is possible, however, the military and scientists must compromise their differences. While the split has grown deep in recent months, it is not irreparable. It may require a lot of give-and-take, but if sober individuals are assigned to the task their differences can be solved in short order.

In the meantime while we are attempting to settle our domestic differences and our diplomats are encountering increasing difficulties over conference tables, an extremely dangerous situation exists along our "northern frontier." Let's face it!

About the Author:

Major Ivin M. Wise recently returned to inactive duty following six years with the Air Force. Formerly a newspaper correspondent and a free-lance writer, Major Wise graduated from Kelly Field and flew B-26's in the Mediterranean for 61 combat missions. Later he served in Headquarters, 12th Air Force, and with the Occupational Air Force in Austria. Upon his return to U.S., Major Wise served with the AAF in Washington. Major Wise has been a contributor to SKYWAYS in the past, but this marks his introduction to readers as a civilian.

Sonic Speed

(Continued from page 52)

is powered by six pusher-type Pratt-Whitney engines of 3,000 hp. It is capable of carrying 10,000 pounds of bombs 10,000 miles at a top speed of more than 300 mph. Several have been delivered, and an order for 100 of the giant bombers has been made.

In the experimental stage, bomber development is concentrated upon jet planes. Six jet-propelled bombers were delivered in 1947 but all of these planes are in the experimental and testing stage.

The North American XB-45 is powered by four GE-Allison jet engines and is capable of a top speed greater than 480 mph, and a combat radius of more than 800 miles. This jet bomber compares with the heavy bomber of World War II but has a much greater bomb capacity. One hundred of these planes have been ordered and the first production models are expected during the Spring.

The Consolidated-Vultee XB-46 is a sister jet bomber of the XB-45. Powered by four jets, the XB-46 has a top speed in excess of 480 mph and a combat radius equal to that of the XB-45. It averaged 533 mph on a recent flight from Tinker Field, Oklahoma to Wright Field, Ohio.

The Martin XB-48 is a six-jet bomber which carries a crew of three and has a bomb capacity of more than 10 tons and a top speed in excess of 480 mph. Two have been ordered.

The largest jet plane built to date is the Northrop YB-49, an eight-jet bomber. This plane is a jet-propelled version of the Northrop *Flying Wing*, or B-35. The aircraft is only 53 feet long but has a wing span of 172 feet. It carries a crew of 13. Only two of these planes have been ordered.

Modern global warfare requires the transportation of men and supplies in ever-increasing quantities. To strengthen the air-transport functions of the Air Force, three new transport planes have been developed.

The Consolidated-Vultee XC-99 is the world's largest land-based plane. A cargo version of the B-36, the XC-99 is designed for a top speed of more than 300 mph and a maximum range of more than 8,000 miles. It is capable of carrying 400 fully equipped combat troops or 335 litter patients with attendants or 100,000 pounds of cargo.

The Boeing C-97 *Stratofreighter* is a cargo version of the B-29 and capable of flying

more than 300 mph with a cargo of 40,000 pounds approximately 4,000 miles. As a troop transport, the C-97 will carry 134 fully equipped combat troops or 83 litter patients with attendants. Six of these planes have been delivered to the Air Force.

A contract has also been completed for 37 of the new Fairchild C-119's. This plane is an improved version of the *Packet* or "Flying Boxcar." It can carry a cargo load of nine tons 2,000 miles and has a cargo capacity of 3,000 cubic feet.

In addition to these planes, the Air Force has several new models of helicopters—the XR-10 which is the largest rotary wing plane in the Air Force and the first twin-engine transport-type helicopter in the world; the XR-12 a five-place helicopter; the R5E which is an improved version of the Sikorsky R-5; and a ram-jet helicopter which employs a ram-jet power unit. This last helicopter (built by McDonnell) weighs only 310 pounds but has lifted cargo weighing 300 pounds.

It will be noted that many of the aircraft types delivered to the Air Force in 1947 were experimental models. This is a necessary step in developing new planes because from



CONSOLIDATED L-13 is a folding wing liaison plane; has cruising speed of 92 mph

the latest developments, research and development must be a continuing project.

Experimental testing of aircraft and equipment is carried on at five installations. Wright Field, Ohio, is the center of these operations, but it is limited in its ability to perform all the tests required by its geographical location, power shortage in the area, and climatic conditions.

Muroc Flight Test Base in California is an ideal testing ground for experimental aircraft because the terrain is basically a dry lake bed affording five- and six-mile runways in all directions. The Safety factor is increased over that of a conventional airport.

Alamogordo, New Mexico, with its vast expanses of open terrain, is used to test guided missiles.

Eglin Field, Florida, headquarters of the Air Proving Ground Command is the site of the Air Forces' Armament Laboratory, and possesses excellent bombing range facilities. There is also located at Eglin Field a Climatic Hangar that is capable of testing aircraft and equipment under temperature conditions ranging from the sub-tropical to 90 degrees below zero.

Ladd Field, Alaska, is used to test aircraft under the actual arctic conditions.

These facilities are essential in keeping pace with the fast-moving developments in aeronautics.

Many problems still have to be solved. With the advent of the supersonic guided missile we entered a new era of flight in which we must find the answers to many aerodynamic, mechanical and physical problems. As long as we stayed in the range of subsonic flight our tried and proved methods and formulae gave us a steady and continued improvement in both aircraft and aeronautical equipment. These subsonic methods will be continued for the present since we have not reached the ultimate in subsonic aircraft and there is still a military need for such planes. However, some of our planes are nearing the supersonic-speed ranges and we are developing pilotless aircraft and guided missiles for supersonic-speed application. It is in the upper realm of flight that our problems become baffling.

For the interim period, our combat aircraft will remain in the subsonic range. This is particularly true of long-range piloted aircraft because the problems here are primarily that of improving existing techniques and controls. When we approach speeds of 500 and 600 mph, automatic operation of many devices becomes a necessity because the human element is severely over-taxed. Reaction is too slow and the forces are too great.

(Continued on page 59)



KELLETT XR-10 is a twin-engine transport-type 'copter with top speed over 100 mph

this experimentation and refinement comes the finished product. The development of an experimental plane requires a vast amount of scientific and technical knowledge. Plans are first drawn based upon the requirements visualized by the world situation and the present stage of research. These plans are then coordinated with all branches and commands of the Air Force to determine their recommendations. The military characteristics of the plane are drawn and an aircraft company consulted on the production of the aircraft. Throughout the production, Air Force engineers work in close association with the company. After the experimental model is produced, it is subjected to rigorous tactical tests to determine its suitability for Air Force operations.

The time lag between the development of a new plane and its delivery in quantity has been a weak link in our national security. A period of eight years elapsed between the time the B-29 was conceived and maximum production was attained. The Air Force has sought to diminish this time lag by considering procurement and industrial planning as co-equal in importance. A Director of Procurement and Industrial Planning has been established in USAF Headquarters to expedite the development and delivery of aircraft. In order for the Air Force to have a continuous flow of new planes representing

MC DONNELL'S ram-jet helicopter for the AF is to be used for artillery spotting, etc.



... and around she goes

(Continued from page 27)

iving a test ride. And a good thing, too. After all, a capable pilot must be ready for all eventualities, and by performing intentional spins the flyer learns how to escape accidental ones . . . or at least recover from them.

In most of today's personal planes there is little excuse for accidental spins, provided the pilot has had proper flight instruction and has learned his lessons well. As a matter of fact, many personal planes are actually difficult to spin. The owner of a new Stinson *Voyager*, for example, recently reported he had unsuccessfully tried to get a spin out of his ship. While the *Voyager* is not a spin-proof airplane, it very definitely is spin resistant. Not all aircraft are spin resistant to that extent, so when you go upstairs to find out whether or not your ship will spin, don't forget to *really* go upstairs. Plenty of altitude is insurance, so get lots of it.

Most personal planes give pilots plenty of warning before they rear up and buck. A mushing on the controls, skidding, low airspeed, even a good shudder and shake . . . all are warnings of an impending stall and possibly a spin.

Contrary to popular belief (among non-pilots), when an aircraft is in a spin, the pilot has *not* lost control of his aerial margin. We're assuming, of course, the plane has been properly rigged and loaded and that the pilot has not unintentionally let his ship fall off. Even in the case of an accidental spin, though, control is not lost for more than an instant. Knowing how to recover, the pilot does so within a turn or two.

To get to the fundamentals, there are three types of spins: 1) Normal, or an intentional spin out of a power-off or power-on wing-level stall; 2) an over-the-top spin, and 3) an out-of-the-bottom spin. These last two are classified as accidental spins and both can be the result of too much rudder on a steep turn, level, climbing or gliding turn.

A stall is the first factor leading to a spin, and to understand spins the student pilot has to take first things first and understand stalls. To all intents and purposes, a stall is a condition in which an airplane is operating at an angle of attack greater than the angle of attack of maximum lift. This increases the load factor beyond that permitted by the engine power applied. The flow of air over the airfoil breaks down, resulting in a sudden and very pronounced loss of lift and . . . loss of altitude. In a power-on stall, the pilot climbs the plane at too steep an angle or the amount of power he's getting from his engine, and at the moment of stall, the plane seems to be hanging in the air on its prop. It's much like driving a car up a hill without increasing power. Eventually the car will cease to continue up the hill, it'll stall and even roll backwards. An airplane does much the same thing except that the engine won't quit, but the plane will nose down and, until it regains flying speed, will continue on down.

In a power-off stall, the pilot cuts his throttle back to idle position, but continues to keep his ship in a landing or slight climbing attitude. Eventually again, the ship will stall and drop its nose to pick up the lost flying speed.

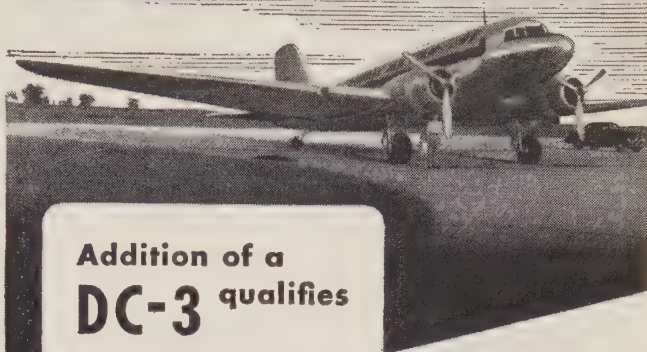
Normal—or intentional—spins can be effected from either of these two stall conditions: power on or power off. A stall becomes a spin when, with both wings stalled, one wing drops down as it stalls and continues to go down while the opposite wing comes up, gaining lift as it does so. The nose of the ship drops down as does the wing . . . and there you have it: a spinning airplane seeming to corkscrew earthward *but under normal or controlled-spin conditions*.

This is a maneuver flight instructors use to sharpen the senses of student pilots. It teaches students quick orientation and the proper reactions for recovery from any so-called unusual plane attitude. The spin is not an aerobatic maneuver done to show off. It is done to help instill confidence of the student in his aircraft and his own ability to be complete master of all situations.

To perform a normal spin, the pilot climbs his trainer or light-plane to a good 3,500 feet. In heavier ships, the pilot should add to that altitude and get a good 8 or 10 thousand feet. These maneuvers require plenty of swivel in a pilot's neck. Be certain, not just fairly sure but *certain*, there are no other planes near—above, below or anywhere around. And another thing . . . if you're going up to do spins, pick the area designated as spin area by your flight instructor.

(Continued on page 56)

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... around she goes

(Continued from page 55)

Using some object on the ground as a reference point, pull up into a wings-level power-off stall. When the ship begins to drop out from under you, get the stick full back (center) and use full rudder in the direction you want to spin. Left rudder if you want to spin counter-clockwise; right rudder for a righthand or clockwise spin. The nose will drop and swing in the direction of the rudder. Keep the stick full back and all controls on until you want to make your recovery. Until you become pretty proficient at this spin recovery, plan to come out at one or at the most two turns. You can keep track of your "revolutions" by noting the number of times your reference point passes in front of you.

Using a reference point this way will also help to keep you from getting dizzy . . . but don't get nervous if you're dizzy the first few spins you make. That's one of the prevalent conditions that practice soon eliminates.

To effect complete recovery, use opposite rudder until rotation stops, then pop the stick, neutralize rudder, and gradually pull out by gently and smoothly bringing the stick back until the plane's nose is again on the horizon and add throttle. By the time you're in level flight you should be no closer than 2,000 feet to the ground. Climb back up to 3,500 and . . . have another go at it. After trying a left-hand spin, go back up and try a right-hand one. Then to break the monotony try a few power-on and power-off stalls. In short order this jockeying around the skies will cease being a mystic conglomeration of up and down and around-and-around, and the whole maneuver will reach a point of precision where at every second you'll know exactly what part of the turn you're in and can pick your coming-out spot with the ease of a cop choosing an apple from a fruitstand (city cop, that is).

In spins as in any other aircraft maneuver, a positive yet smooth and coordinated operation of the controls is essential. Horsing back on the stick in the pull-out, for example, could throw your plane into a secondary or high-speed stall. So remember . . . easy does it in spins, stalls or any other aerobatic maneuver in all lightplanes.

Most planes, assuming again they are properly loaded and rigged, will come out of a spin by themselves. If the pilot takes his feet off the rudder and lets go of the stick, the ship will return to level-flight attitude by itself. This is its inherent stability.

If you want to test out your lightplane, go on up to 5 or 6 thousand feet and try it. Unless your ship is placarded against spins, it'll probably do a better job of recovery on its own than you can do. And if it is placarded against spins, take the builder's word for it . . . and leave spins to someone else or do them in another plane. Experimentation in spinning, above and beyond the normal power-on or power-off spins, is for experienced pilots and not novices. And if you're a student pilot, don't spin a type of plane you've never flown before, at least not without a flight instructor riding with you so that any spin peculiarities that might show up can be handled by him in an emergency. That kind of "testing" calls for the fine hand of a licensed pilot with plenty of hours.

An over-the-top spin, Number 2 on our list,

is a maneuver with plenty of whip. Whether it is done intentionally or not, an over-the-top spin gives the pilot a sudden shaking out, like being the tail-ender on a crack-the-whip.

Both over-the-top and out-of-the-bottom spins are caused by too much rudder on a steep turn, a climbing, gliding or level turn. The essential difference between the two maneuvers is that in an over-the-top spin an excessive amount of top rudder is used, while in an out-of-the-bottom one, too much bottom rudder is used. In combination with either excess, there's back pressure on the control stick . . . and that's what dumps you.

To illustrate the how's of an over-the-top spin, let's watch Dilbert cavort around the sky. He's the likely one to get himself into an over-the-topper. With his ship at an altitude of about 3,000 feet and cruising at fairly low power, say about 2250 RPM in a 65-hp *Cub*, Dilbert tries his hand on some steep turns. As his ship noses around, centrifugal force builds up and increases the load factor on his wings. When Dilbert spots the nose dropping a little, he tries to pick it up by using top rudder and at the same time horsing back on the stick. That does it! The top wing stalls out, the bottom wing gains lift . . . and over she goes and down, doing a complete 180 so that Dilbert is spinning in the direction exactly opposite to the direction he was originally turning!

Recovery from this kind of a spin is the same as for a normal spin. The big problem is orientation. In a spin such as this, the ship flips over so quickly that it's hard for even an alert pilot to get himself lined up—although we must remember that an alert pilot wouldn't be guilty of an over-the-topper.

An alert pilot doing steep turns would not use top rudder and horse back on the stick when he notices his plane's nose dropping. Instead, he'd shallow out the bank and add some power . . . all of which is insurance against over-the-top spins.

An out-of-the-bottom spin, or Number 3 on the list, is same as the over-the-top one except that instead of using top rudder, the pilot uses bottom rudder.

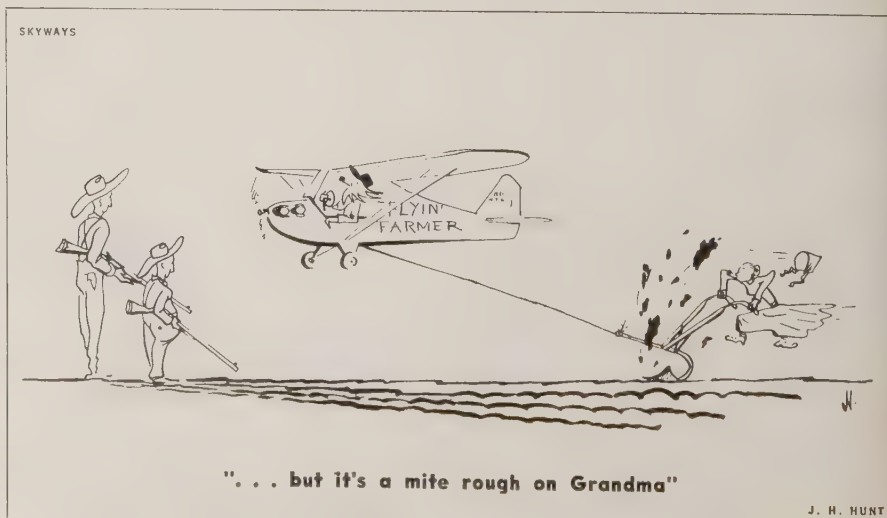
Let's put Dilbert at it again, only this time he's doing gliding turns. Centrifugal forces build up, same as before. This time, however, Dilbert holds inside rudder. This causes the plane to skid into a tighter turn. The nose drops . . . and again Dilbert tries to bring it up with the stick instead of reducing the amount of bank and adding power. Dilbert's ship loses airspeed, he stalls

out holding bottom rudder . . . and spins in the same direction he's turning. Recovery from this out-of-the-bottom spin is same as for normal: cut off power, use opposite rudder until the plane's rotation stops, then pop the stick, neutralize the rudder and gently bring the stick back until the ship is again in level flight, and add power. Here again, as in all spin recoveries, the pilot must remember not to yank back on the stick. Smooth and easy does it . . . and keeps you from that wicked secondary stall.

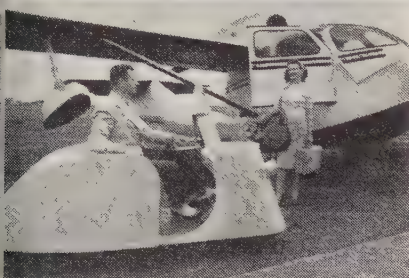
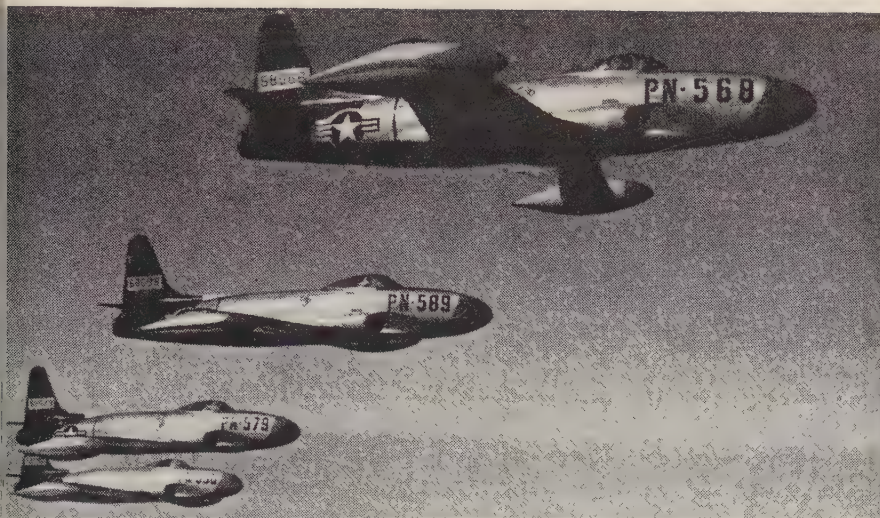
Before going upstairs to try out a few spins, brush up on these few rules for spinning. It's a plain case of brush up now and they won't be brushing you up later.

1. Don't spin any ship placarded against spinning.
2. Never get excited. Confusion can make you move controls opposite to the direction you really want them to go.
3. Don't hurry. Hold controls in recovery position long enough for them to take effect.
4. Always practice spins at sufficient altitude.
5. Don't spin any ship with doubtful spinning characteristics. Leave that to a competent instructor . . . with plenty of altitude.
6. If you're flying a combat or trainer-type ship, check the pilot's manual and all placard notices before you attempt spins . . . and check with an instructor, too.
7. Learn your spin recovery procedure well . . . and mind those steep turns and stalls.
8. Before you practice spins, check to make sure you are in the designated spin area.
9. Always clear yourself before every spin try. Keep your neck on a swivel and watch out for the other fellow as well as yourself.

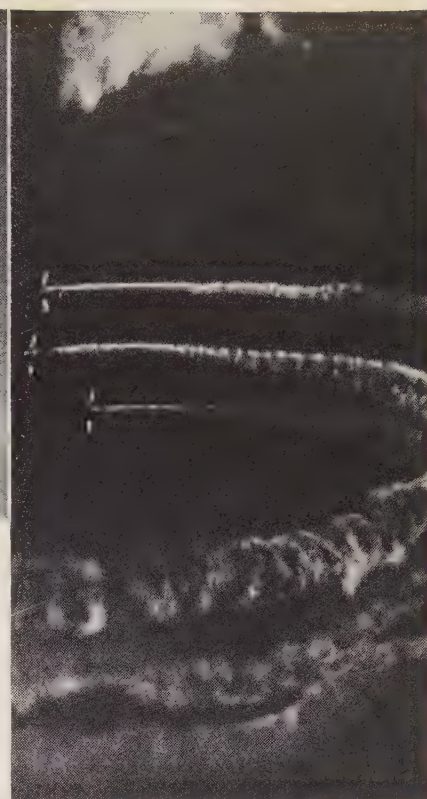
We're going to add a 10th rule to that list: Mind your instructor (if you're a student, of course). His remarks regarding spins and recovery may not always coincide with ours. Very seldom do two instructors share the same opinions on things. But we believe sincerely you ought to take the word of your own instructor in all things pertaining to flight. So . . . mind your instructor. He's a great guy and knows one h... of a lot about flying. You'll do well to be as good a flyer as he is. We'd like to be.



J. H. HUNT

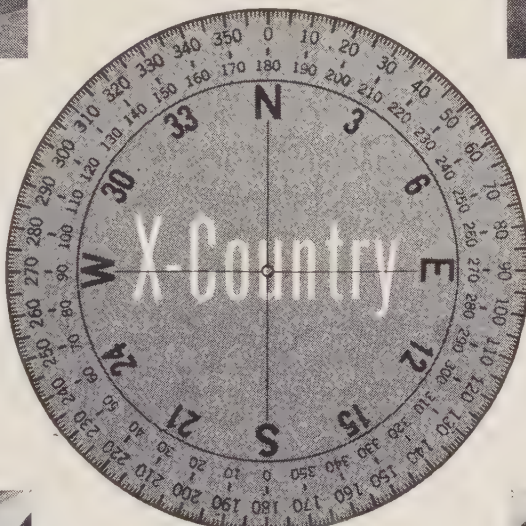


HAT-IN-THE-RING Squadron of P-80's (above) is first jet fighter plane outfit to be equipped for Arctic operations. The 94th squadron will be based in Alaska for six months' training



OTORETTE, a two-seater designed for inexpensive transportation flyers, features a 6-hp rear-drive engine, a top speed of 45 mph, and burns 75 miles to a gallon of gasoline

HEEL PANTS are part of the equipment put on ships. The DeMornay-Dodd Co., makers of photographic equipment, fitted these custom-built heel pants on their new Cessna 140

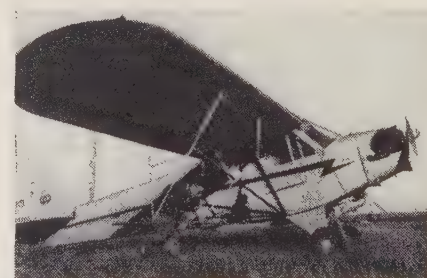


AIR SHOW crowds at Spokane, Washington, got this view of three SNJ Navy trainers, converted for civilian use. Cameraman in another plane took this of the ships at the top of loop

FARMERS are the ones getting plenty of use from their planes. This *Cub* owner, in Saginaw, Mich., rigged up a crop dusting unit. He controls the feed apparatus from front cockpit



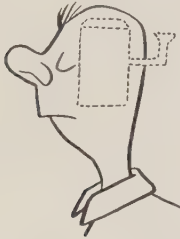
MARTIN 2-0-2 airliner shown here is now enroute to Caracas where it will be put into service by Linea Aeropostal Venezolana. Ship carries 36 people, cruises from 245 to 270 mph



Dilbert

(Continued from page 43)

exhaustion. With high-powered engines, this is often due to the use of too rich mixtures, or excessive power settings during "cruising." *Warning:* All planes require full-rich mixture during take-off, or any full-power operation; lightplanes seldom require any change during "airport flying." Fuel exhaustion results from such simple things as not knowing how much gas an engine consumes, or the capacity of the tanks, and failing to check gas on hand prior to take-off. Don't starve your engine!



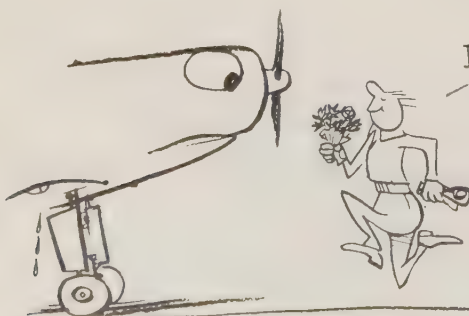
One empty tank!

A glaring example of fuel-system ignorance occurred during preparation for the Dole Flight to Hawaii in 1927. Granted there was \$25,000 prize money for the winner, but even a million bucks wouldn't have excused the stupid hysteria displayed by certain supposedly experienced aviators. When questioned, they solemnly gave their engine consumption, gas capacity and most economical cruising speed. With these figures, and knowing the distance to Hawaii, it didn't take a Joel Kupperman to figure out that some of them would have had nothing but air left in their gas tanks while they were still hundreds of miles short of their goal, even with perfect weather conditions.

b. Preflight Checks.

The majority of pilot-caused engine troubles during take-off are in this category. Most of them could be averted by proper idle mixture checks, and by running up and checking engines, generators and mags prior to take-off. Of course, you must know what to look for on these checks. If you don't know, make it a point to find out before your next hop. Such knowledge will help you detect symptoms of sub-par operation and bring them to the attention of a competent mechanic before complete failure occurs.

Use of the check-off list will insure that your propellers are in proper adjustment



I can't bother
with a check
I gotta date



Halp! I'm
being strangled by ice!

prior to take-off; and also for landing. The same applies to blower settings.

And remember, after long taxiing or idling, it is vitally important to clear your engines again before take-off.

c. Use of Throttle

Even Dilbert knows that suddenly jamming the throttle on full during take-off will make an engine choke and cough. He isn't the only one, however, who forgets this during an interrupted landing approach. A smooth, quick throttle movement will get the best results in any emergency. Of course, the same guys also allow their engines to cool off and foul up during glides and approaches. Then they curse and scream when their engines fail to respond in a crisis.

Excessive reduction of rpm, or manifold pressure, immediately after take-off, occasionally results in pilots failing to remain airborne. Ditto when they don't detect a creeping throttle.

d.. Carburetor Icing

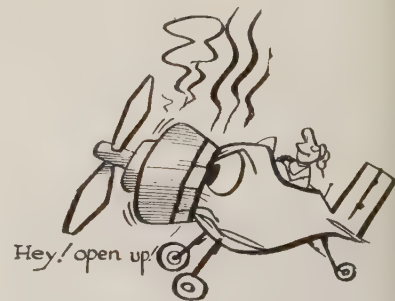
This is a toughy because it takes brains to handle. The big drop in temperature as gas is vaporized, explains why carburetors occasionally ice up with air temperatures as high as 85° F. The main danger area is between 40 and 75 degrees, depending on the moisture in the air. So watch that humidity.

One of the first symptoms of icing is loss of engine power with no change of throttle position. When this happens, your carburetor air heater should be used immediately, preferably even before it happens. If you do not have a heater, don't fool around in icing weather. For emergency use, it is well to know that reducing engine power will sometimes stop icing before it becomes dangerous. Also, in lightplanes *only*, setting the mixture control at "full lean" may cause the engine to spit back through the air scoop and blast the ice from the intake system.

NEVER . . .

1. Try to fly with automobile gasoline.
2. Use substitute parts for repairs.
3. Attempt repairs or adjustments yourself, which if incorrectly made, could affect the efficient operation of your engine.
4. Monkey around your carburetors or magnetos. Even experienced mechs hesitate to make any adjustments on these accessories without proper testing facilities. The one exception is the idle adjustment on the carburetor, which they can make by following General Engine Bulletin No. 2. Incidentally, incorrect idle adjustments cause many an engine to cut out during take-off.

There are two pilot errors which, while not necessarily the *immediate* cause of engine failures, can often be traced back as the *underlying* cause. One of these is the improper use of cowl flaps. When these are closed immediately after an engine stops running, the engine heat is unable to dissipate rapidly enough and damages the electrical insulation, eventually causing a breakdown. The other error is to exceed the op-



Hey! open up!

erating restrictions on crankshaft speeds, oil temperatures and pressures, manifold pressures, head temperatures, etc., as laid down in your engine manual. These restrictions weren't placed there arbitrarily, just to cramp your style; they were determined as the safe operating limits by exhaustive tests. You should be at least as interested in the efficient operation of your engine as the manufacturer.

If your airplane is parked out doors, invest in an engine cover to prevent dust, moisture and other atmospheric impurities from corroding the internal parts of your engine. A set of engine covers will be a helluva lot cheaper than the repair bill you'll get if you allow your plane's engine to soak up those impurities. It would even be an excellent idea for you to invest in a complete set of covers for your ship.

The engine you fly behind is the most important engine in the world—YOUR engine! Take care of it.

Sonic Speed

(Continued from page 54)

mechanical, hydraulic, pneumatic, and electrical automatic devices to aid navigation, control, engine adjustment, bombing, control, and turret operations are very necessary.

As far as power plants are concerned, the reciprocating engine is still our best reliance for long-range sub-stratosphere flight at subsonic speeds. However, the propeller-driven turbine gives an indication of becoming a strong competitor. The reciprocating engine, particularly with compounding, has the advantage of low fuel consumption which other types of power plants cannot equal at present.

The physiological aspect of high-speed flight is indirectly reflected in aircraft design and it is one of our major problems. Man may not be constructed to absorb the terrific accelerations and decelerations which are likely to be encountered in supersonic flight. Moreover, he cannot exist in a vacuum. Sustained tests are being conducted to determine man's limitations and to determine ways for overcoming them in this field.

In the field of electronics the early warning radar range of 200 miles now available must be extended to several thousand miles; there is also a requirement for more information on wave propagation characteristics if we are to solve problems involved in the guidance of pilotless aircraft at high altitudes. Likewise ambient temperatures of equipment used in pilotless aircraft must be stepped up several hundred degrees. Coincident with these problems is the necessity for an aggressive and comprehensive upper-air research program. Our present meteorological data above 60,000 feet is very meager and for our purposes we must have information about that altitude.

We had left to us after World War II pilotless aircraft missiles capable of speeds nearing 4,000 mph; we had jet propulsion, radar, and the atomic bomb. This is the background that we have upon which to base our future research and planning with science and industry. The necessary research and development to maintain superior military air weapons is costly in dollars, but it is cheaper than defeat. The challenge of air security belongs not alone to the Air Force, science, and industry, but to the nation as a whole.



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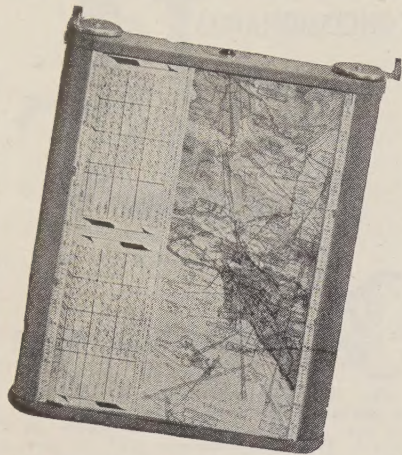
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XS-1... Worst-Kept Secret

Washington:

The supersonic performance of the U. S. Air Force's experimental XS-1 has been one of the worst-kept secrets in Washington's Pentagon since the end of the war.

When an unauthorized article appeared in an aviation magazine disclosing that the tiny needle-like aircraft flew faster than the speed of sound, many Washington reporters and correspondents raised a legitimate howl that echoed from one city room to another.

Most of the "reliable" editors and bureau heads had been honor-bound *not* to disclose information on the progress of the XS-1 other than data released through official channels. For some months military spokesmen have been avoiding discussions on the XS-1, and most reporters had cooperated. A few had hinted that "progress was being made" but made no specific references to actual performance.

In its initial announcement on the aircraft, the U. S. Air Force publicized the XS-1 as "designed to fly at altitudes up to 80,000 feet and 1,500 miles an hour."

"Slick" Goodlin, a civilian test pilot for Bell Aircraft Company, the manufacturer of the XS-1, made the first series of flights starting with a power-off flight after being hauled to high altitude by a B-29 *Superfortress*. After making the first power flight, Goodlin announced that he would shortly be able to pierce the supersonic barrier. Before he had that opportunity, The Air Force accepted the model and assigned officer pilots to continue the tests.

From that moment an "iron curtain" of military censorship hid all further details.

However, in spite of the best precautions, every major news agency in Washington "knew from reliable sources" that the XS-1 was making notable progress. At the same time, Air Force public relations officers were making every effort to retract some of their earlier enthusiastic statements, pointing out that the rocket-powered XS-1 was a "labora-

tory test model" and would be used to test "propulsion units and aerodynamics."

For a while it seemed as though voluntary censorship, which had been so successful during the war, would prevail and mention of the XS-1 temporarily disappeared.

Yet, a major news leak was inevitable.

Several weeks ago this writer lunched at a Pentagon cafeteria frequented by officers and civilian employees. Sitting at a nearby table were a Navy officer and an Air Force colonel. The Navy officer needed a companion about the capability of the Navy jet airplane which had just smashed the world's speed record.

In a fog-horn voice, audible through the cafeteria, the colonel reported, "Crowd you wish, but our XS-1 flew over 900 miles an hour this past week."

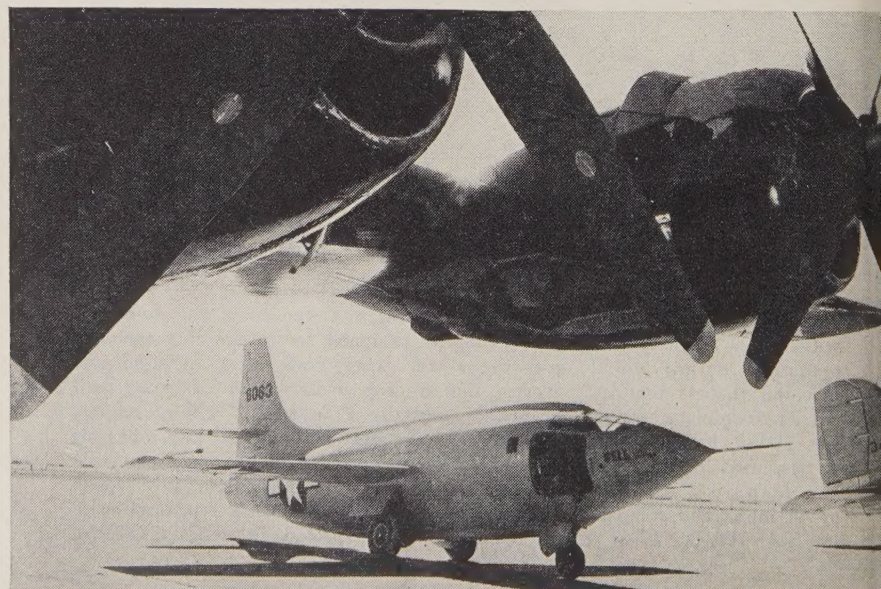
Needless to say no reporters were there.

It is difficult to understand the military sudden reluctance to disclose progress of the XS-1 in view of the original claims plus the official insistence that the supersonic aircraft was solely an experiment and would not be developed into a combat fighter.

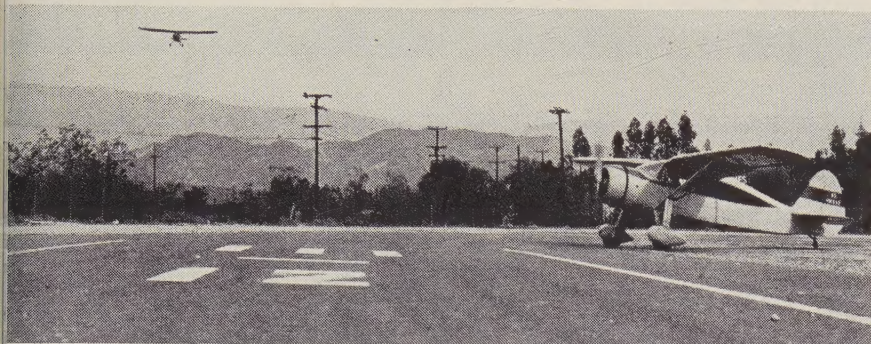
It is conceivable that lessons learned from tests with the first American-built rocket aircraft will be incorporated in future designs. Yet, cut-away pictures of the airframe have been printed as well as a number of actual photographs of the stubby-winged airplane. The rocket power plant was displayed publicly by the U. S. Navy, who performed the development work. Sufficient details had been revealed to permit any foreign power to copy the model in detail.

Whether the XS-1 did or did not smash through the supersonic barrier is still an official secret, with military spokesmen refusing to comment. The public, sensing development as important as when the first submarine slid under the waves, is willing to accept the unauthorized story and wonder what similar impact this evolution will have on civilization and its desire for peace.

DID IT . . . or didn't it, meaning the XS-1, break through the talked of speed barrier



PLANE SERVICE



TIPS FOR THE PLANE OWNER

CLEANERS AND SUPERVISION. No matter how many times owners, operators, mechanics and line boys are warned against using glass cleaning compounds on plastic canopies and windshields, it seems that there'll always be one more lunkhead who doesn't know the difference or just doesn't care. One owner we recently heard about, who always prided himself on the excellent care he bought for his plane, ran into just that situation a while back. He had parked his plane and asked for a general wipe and windshield cleaning. Then, at the last minute he discovered he had forgotten something in the plane so returned to it—just in time to find a line boy blithely spraying a well-known window-glass cleaner on his plastic windshield. Luckily, it was washed off in time to prevent damage, but if he hadn't caught it he might have wondered a few days later what was causing his windshield to craze and turn color. The line boy's excuse was, "It's easy to use and anyway that's all the boss gives us."

It's worth any plane owner's time, when requesting a cleaning job, to check on the cleaner used. Don't allow any work done with: 1) compounds in unlabeled containers; 2) glass cleaners; or 3) any other cleaners not specifically labeled for use on plastics.

ENAMEL ON METAL. The swing toward automobile-type enamel finish on the more expensive all-metal private planes has seemed ordained for a long time to satisfy a public conditioned by automotive advertising. Painted metal surfaces on planes demand treatment similar to that accorded automobiles, including the usual waxes to preserve the gloss finish. It is also extremely important that any down-to-metal scratches and flaking spots be checked at once. Breaks in the paint allow dirt and grease to undercut if the bad spots are not caught and paint-patched immediately. Send to the plane's manufacturer or the maker of the paint for information on the best methods of surface upkeep.

ENGINE OIL PRESSURES. Planes that show low or fluctuating oil pressures have sometimes gone into maintenance shops and

have come out cured, but with very large service bills attached. Occasionally, parts replacements are not necessary if a thorough cleaning job is done first on the accessories that may cause loss of pressure. Take the Continental 65-hp or 85-hp engine as a general example. When pressure first fluctuates or runs low, look at your oil for quantity and cleanliness. Check and clean the main oil screen. If the fault isn't there, check and clean the oil-pressure relief valve. Then remove the oil sump tank and check the oil suction tube, there may be dirt in the tube screen. Clean out the oil pressure gauge line and check the instrument for improper functioning. If your engine has begun to use up too much oil, inspect all substances found in the screens for evidence of bits of metal. The important point to remember before allowing replacement of parts is that defective functioning of the oil system may be due to dirt clogging it. A good engine run-up and ground check before maintenance work and after the cleaning will let you know whether any further servicing is required. The remark about metallic substances is included because evidence of metal calls for a very complete engine check, depending on the type, shape and possible recognition of where the metal originally came from.

CHARTER PLANE CARE. When a pilot goes out to an airport to rent or charter a plane, the smart operator will examine the pilot's credentials, check him out in the plane requested if he is not well-known at the airport and, if he's really on the ball, require the pilot's signature on a complete rental form which lists conditions and penalties involved in renting the plane, with nothing left to a mere verbal understanding. If an operator has to be careful, how can a pilot afford to be less so? The flyer should check the plane's log book for recent gripes, be present at the servicing of the plane and at the same time give it a complete visual pre-flight inspection. Before taking off he should be sure of the minimum range and latest gasoline consumption averages for that particular plane, rather than just the type. It doesn't pay to stretch your luck.

—Jerry Leichter

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